

SHIP PRODUCTION COMMITTEE  
FACILITIES AND ENVIRONMENTAL EFFECTS  
SURFACE PREPARATION AND COATINGS  
DESIGN/PRODUCTION INTEGRATION  
HUMAN RESOURCE INNOVATION  
MARINE INDUSTRY STANDARDS  
WELDING  
INDUSTRIAL ENGINEERING  
EDUCATION AND TRAINING

May 1, 1997  
NSRP 0496

# **THE NATIONAL SHIPBUILDING RESEARCH PROGRAM**

## **Report on Short Courses for the Training of Shipyard Management and Workers**

U.S. DEPARTMENT OF THE NAVY  
CARDEROCK DIVISION,  
NAVAL SURFACE WARFARE CENTER

in cooperation with  
National Steel and Shipbuilding Company  
San Diego, California

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**REPORT**

**ON**

**SHORT COURSES FOR THE TRAINING  
OF SHIPYARD MANAGEMENT  
AND WORKERS**

**A Project of  
the National Shipbuilding Research Program**

**for**

**The Society of Naval Architects and Marine Engineers  
Ship Production Committee**

**Education and Training Panel (SP-9)**

**PREPARED BY**

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**May 1997**

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16. Abstract  This report summarizes the presentation of six short courses that were given around the country. The short courses presented were:  Quality Function Deployment Modern Commercial Shipbuilding Design for Production Integration Implementing Advanced Technology  Some of the course material and the knowledge obtained during the course presentation discussion has been used in the development of new ship production courses at The University of Michigan, Department of Naval Architecture & Marine Engineering.					
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## **ACKNOWLEDGMENT**

This report has been prepared to record the performance and results of the short courses presented around the U.S. in 1995 and 1996.

Without the assistance of a number of shipyards, which sponsored the courses in their facilities and assisted, with some of the arrangements, the courses would not have been presented. Also Howard Bunch and Mark Spicknall presented some of the courses and their contribution is acknowledged with appreciation.

The National Shipbuilding Research Program, Education and Training Panel (SP-9), chaired by Pamela Cohen of UMTRI, funded the short course project. The SP-9 Panel is one of the Ship Production Committee panels of the Society of Naval Architects and Marine Engineers, which were established with the purpose of improving U.S. shipbuilding performance.

# EXECUTIVE SUMMARY

This report is the final report and summarizes what courses were presented and where. It also includes course contents and feedback from the attendees.

The feedback from the attendees is worth reviewing as it includes many good suggestions about how future courses should be developed and presented as well as who should attend such courses.

Although the project title emphasized that the courses were for both “management” and “workers”, very few managers attended. This was unfortunate, as the most frequent feedback comment was “my boss should have attended this course.”

The short courses that were developed were:

- Quality Function Deployment (QFD)
- Modern Commercial Shipbuilding
- Design for Production Integration
- Implementing Advanced Technology

They were presented in six locations around the country even though the contract only required five. This was possible due to the reduction in air travel cost during the period of course presentations. The locations were:

- NASSCO, San Diego
- Todd Pacific Shipyards, Seattle
- Mobile, Alabama
- BIW, Bath, Maine
- Newport News Shipyard
- Designers & Planners, Inc. Arlington, Virginia

One additional course was presented to ASNE/NAVSEA in Arlington, Virginia on concurrent engineering. The courses were mostly well received, although there were a number of suggestions for improvement. Actual attendance was always less than that signed up, except in Arlington, Virginia. Also, many that attended the beginning were in and out during the remainder of the course. This was obviously due to the demands of the day on the attendees, and a disadvantage of holding the course at a work site.

Some of the course material and the knowledge obtained during course presentation discussion have been used in the development of new ship production courses at The University of Michigan, Department of Naval Architecture & Marine Engineering.

At the end of each course the attendees were requested to fill out a course evaluation sheet, such as the one attached. The responses have been collected and grouped together for the record and are provided in the attached summary.

In general most attendees were positive about the courses. A few felt there was nothing new and most of the suggested improvement changes were just common sense. There were also some important negative responses. There were also some that refused to accept that U.S. shipbuilders were not as productive as the best of the world.



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## **1.0 INTRODUCTION**

The Short Courses project was originally conceived in 1993 and a proposal developed by the University of Michigan Transportation Research Institute's Marine Systems Division (UMTRI/MSD). The concept was to take existing short courses that had been previously presented by Howard Bunch, Mark Spicknall and Dr. James Wilkins, bring them up to date, and present them to shipbuilding managers and workers. Howard Bunch retired from UMTRI/MSD before the project was funded and the task fell to his predecessor, Richard Moore, who in turn assigned the project to Thomas Lamb, who had just joined the division in June 1995. Howard Bunch was still available for some of the course presentations, but in general a whole new preparation of three of the four courses was required. This report details the final course contents, where they were presented and by whom, as well as attendance and feedback from the attendees.

## **2.0 COURSE PLANNING**

The first step in the planning was to assign presenters, who would also be responsible for preparing the course material. Howard Bunch agreed to present the MODERN COMMERCIAL SHIP PRODUCTION course, but could only present it in four locations due to his other commitments. Thomas Lamb presented it in the other two locations. Mark Spicknall presented the QFD course in three out of five locations and again Thomas Lamb presented it in the other two locations. Thomas Lamb presented all other courses.

Next, to let potential attendees know about the courses, notices about the short courses were published in the NSRP Newsletter and the SNAME MARINE TECHNOLOGY. In addition UMTRI/MSD sent out notices to all program managers, panel chairpersons and members. The later mailing included a request for indication of interest, how many attendees were anticipated, and if shipyards would be willing to hold the course in their facilities. A copy of this form is attached as Appendix A.

From the responses, plus many phone calls, a potential attendance profile was developed and the five areas that had the most potential attendees were selected. They were San Diego, Seattle, Bath, Newport News and the Gulf. Not all areas were interested in all the courses. For example, Bath Iron Works was not interested in QFD. Brochures were prepared for each location, which included a description and schedule of each course, and appropriate versions were distributed as the initial notice with request to distribute throughout companies. Registration forms were distributed in the same manner as the other promotional documents. Copies of typical brochures are attached in Appendix B.

It should be noted that in Seattle MODERN COMMERCIAL SHIP PRODUCTION and IMPLEMENTATION OF ADVANCED TECHNOLOGY were combined into one presentation.

There was funding left after the presentations in five locations, mainly due to the fact that some locations did not chose to have all the courses presented. In addition, travel costs were reduced due to fare wars. As there was significant interest, additional presentations of the courses were given in the Washington D.C. area. The complete course presentation record is given below.

<b>DATE</b>	<b>COURSE</b>	<b>LOCATION</b>
October 19-20, 1995 Seattle	Quality Function Deployment	Todd Pacific Shipyard,
November 8-9, 1995 Mobile	Quality Function Deployment	Battleship ALABAMA,
November 8-10, 1995 Seattle	Design for Production Integration	Todd Pacific Shipyard,
November 8-10, 1995	Modern Commercial Ship Production	NASSCO, San Diego
November 14-16, 1995	Modern Commercial Ship Production	BIW, Bath, Maine
November 28-30 1995 Mobile	Modern Commercial Ship Production	Battleship ALABAMA,
November 29-December 1, 1995	Design for Production Integration	Newport News Shipyard
December 13-15, 1995	Modern Commercial Ship Production	Newport News Shipyard
December 14-15, 1995	Quality Function Deployment	NASSCO, San Diego
December 18-20, 1995 Mobile	Design for Production Integration	Battleship ALABAMA,
January 8-10, 1996	Design for Production Integration	NASSCO, San Diego
January 31-February 2, 1996	Design for Production Integration	BIW, Bath, Maine
February 12-13, 1996	Implementing Advanced Technology	NASSCO, San Diego
February 28-March 1, 1996 Seattle	Modern Commercial Ship	Todd Pacific Shipyard,
March 4-5, 1996	Production and Implementation of Advanced Technology	
March 6-7, 1996	Implementing Advanced Technology	BIW, Bath, Maine
April 14-15, 1996	Implementing Advanced Technology	Newport News Shipyard
August 13-14, 1996	Quality Function Deployment	Arlington, Virginia
August 28-29, 1996	Modern Commercial Ship Production	D&P, Arlington, VA
	Design for Production Integration	D&P, Arlington, VA

### **3.0 COURSE VENUE**

The table in section 2.0 - COURSE PLANNING shows where the courses were held. When they were held in a shipyard or design office, they agreed to let outsiders attend. The assistance of the companies in providing space and equipment is appreciated.

At first it was considered important to hold the presentations in shipyards based on the belief that this would maximize attendance. While it is still believed that this is true, it had the disadvantage that attendees were subject to calls from within the shipyard and being pulled out of the session to deal with “crises.” Also, in Mobile the courses were held in locations near the two shipyards, were well attended, and interference was considerably less. However, some attendees went back to their office during lunch break and a few sometimes did not make it back for the afternoon.

In the event that similar courses are planned for future presentations and it is desired to get “top level” managers involved, it is believed that it would be better to hold the courses in a central location with ease of travel and not at shipyards.

### **4.0 COURSE PRESENTATION**

The course materials consisted of the presentation slides, supportive write-ups and papers/articles on the subject matter. These were bound into a course manual and each attendee was given a copy. In addition, videos on aspects of the subject as well as many photographs were used.

The approach to the course was to give as much hands on activity as possible. Therefore, exercises were inserted in each section. Typically, the first day consisted of more lecture and discussion with the extent and time devoted to exercises increasing as the course continued. This can be seen from the course agendas, which are attached in Appendix C.

The two courses presented in D&P, Inc. offices in Arlington Virginia were videotaped, but no editing or even duplication of them has been undertaken due to lack of funds and time.

The course manual for the course on Quality Function Deployment is already a NSRP Report (NSRP 0396). The other course manuals have been given NSRP report numbers as follows:

NSRP 0467	CONCEPTS OF MODERN SHIP PRODUCTION
NSRP 0468	IMPLEMENTING ADVANCED TECHNOLOGY
NSRP 0469	DESIGN FOR PRODUCTION INTEGRATION

## 5.0 COURSE ATTENDANCE

The attendance was disappointing for five reasons:

1. The overall numbers were low. Average was 16.
2. Two of the major shipyards and all of the inland shipyards did not participate.
3. Very few managers attended.
4. Very few engineers attended.
5. Sometimes 50% of those who had signed up did not attend.

The attendance record is as follows:

<b>COURSE DC</b>	<b>SEATTLE</b>	<b>SAN DIEGO</b>	<b>NEWPORT</b>	<b>BIW</b>	<b>MOBILE</b>	<b>WASH</b>
Quality Function Deployment	NA	NA	NA	NA	NA	NA
Design for Production Integration	12/10	29/15	16/32	21/19	14/8	22/21
Modern Commercial Ship Production	24/13*	NA	19/18	23/24	24/16	28/22
Implementing Advanced Technology	24/13*	26/24	15/12	23/22	23/19	NA

\*Combined Course

First number is the number of people who signed up. The second number reflects actual attendance.

## 6.0 COURSE FEEDBACK

At the end of each course, the attendees were requested to fill out a course evaluation sheet, such as the one attached. The responses have been collected and grouped together for the record and are provided in Appendix D.

In general, most attendees were positive about the courses. A few felt there was nothing new and most of the suggested improvement changes were just common sense. There were also some important negative responses. In addition, some attendees refused to accept that U.S. shipbuilders were not as productive as the best of the world.

## **7.0 LESSONS LEARNED**

The attendees' feedback will be used for lessons learned. In addition, the lessons learned by the course presenters which should be considered for future courses, are:

- A. For courses that exceed one day, the last day should only be scheduled for the morning. In all courses, except at BIW, up to 50% of the attendees disappeared on the final afternoon.
- B. For multi-day courses, maximize discussion and activities for attendees.
- C. Actual lecturing should be kept to below 50% of time.
- D. Use a number of presenters, rather than just one. If this is not possible, for whatever reason, break the focus on the presenter by using supporting videos.
- E. Get course material distributed to attendees before course presentation and provide incentive for attendees to review before attending.
- F. Hold off-site. This has many benefits and a few obvious disadvantages. One major benefit is in the area of promoting teamwork. A couple of hours in the late afternoon can be used for teams to prepare their assignments.

# **APPENDIX A**

## **SHIPBUILDING TRAINING COURSES INDUSTRY SUPPORT QUESTIONNAIRE**



NSRP SP-9 PANEL (EDUCATION & TRAINING)

# SHIPBUILDING TRAINING COURSES INDUSTRY SUPPORT QUESTIONNAIRE

YES NO

1. Are the proposed training courses of interest to you?
2. Will your support depend upon location of meeting place?
3. Can you provide meeting space and are you willing to let other company personnel attend? (Assume attendance will be from 20 to 40.)
4. Is the proposed schedule for courses in your area acceptable to you?
5. How many people will you send to each course:

COURSE	IN YOUR FACILITY	IN YOUR TOWN	WITHIN DAILY DRIVING DISTANCE	REQUIRE OVER- NIGHT STAY
1				
2				
3				
4				
5				

6. Please identify any additional topics you would like to see covered.

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7. Do you have any other recommendations/ideas for the training courses?

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COMPANY: \_\_\_\_\_

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

# **APPENDIX B**

## **TYPICAL COURSE BROCHURE**

THE NATIONAL SHIPBUILDING  
RESEARCH PROGRAM

# SHORT COURSES FOR SHIPYARD MANAGERS AND WORKERS

DESIGN FOR PRODUCTION  
INTEGRATION

MODERN COMMERCIAL SHIP  
PRODUCTION

IMPLEMENTATION OF  
ADVANCED TECHNOLOGY

IN  
BATH, MAINE

Sponsored by SNAME  
Ship Production Committee SP-9  
(Education and Training) Panel

## INVITATION AND BACKGROUND

*The U.S. shipbuilding industry is at an important cross road as it prepares to enter the 21st century. Navy shipbuilding orders are declining and are insufficient to maintain the current level of shipbuilding. At the same time it appears that the demand for commercial ships is improving to the level where commercial shipbuilding may offer a profitable alternative to Navy shipbuilding for U.S. shipbuilders.*

*To do this U.S. shipbuilders must change many of their current practices. Many shipbuilders have been on this difficult road for some time but many are just starting.*

*To help accomplish this difficult journey, the National Shipbuilding Research Program Panels have developed and recorded, in their reports, many of the steps that will need to be taken, by the projects undertaken by the Panels.*

*In addition, both the NSRP Ship Production Symposium and the SNAME Annual Meeting transactions contain papers based on the NSRP Panel projects.*

*Also the University of Michigan has included many of the practices in their undergraduate and graduate courses as well as in short courses given to Navy personnel and to the industry in general. Although many people in the U.S. shipbuilding industry receive the NSRP Reports and distribute them to others in their company and some shipbuilders use them in their in-house training programs, there is still a large group of shipbuilding personnel who have not had the opportunity to avail themselves of this knowledge.*

*With this in mind the SP-9 Panel is sponsoring the presentation of these short courses to shipbuilders and others in the industry to help the wider dissemination and understanding of the practices contained therein.*

*This brochure is your invitation to attend one or all of these short courses. We hope you will take advantage of this unique opportunity.*

## SHORT COURSE VENUE

BATH IRON WORKS has kindly offered to hold the courses in their shipyard Training School in Bath, Maine. Space limits attendance to 40 attendees, so please register as soon as possible. Final directions will be given to all registered attendees.

## SHORT COURSE SPONSOR

The NSRP SP-9 (Education and Training) Panel is the sponsor of the Short Courses. Mr. Thomas Lamb, A Research Scientist at UMTRI is the project director.

## SHORT COURSE CONTENT

The Modern Commercial Ship Production course is an upgraded short course presented at UMTRI, NAVSEA and a number of shipyards in the U.S. over the past few years. The Design for Production Integration course is based on new courses being developed for the new U of M NAME Concurrent Marine Design program. The Advanced Technology course is a new course developed from new material.

**ATTENDANCE WILL BE LIMITED  
TO 40 ATTENDEES, FIRST COME,  
SO PLEASE**

**REGISTER EARLY!**

**PLEASE PASS THIS  
BROCHURE ON TO  
OTHERS WHO MAY BE  
INTERESTED.**

## SHORT COURSE INSTRUCTORS

Mr. Howard Bunch is well known as the originator of the Ship Production courses at University of Michigan and as the Navy Professor of Ship Production. He has presented short courses in Design for Production and Ship Production Technology to NAVSEA and at MIT Summer Program.

Mr. Thomas Lamb recently joined UMTRI as a Research Scientist and provides education in Ship Production Technology at University of Michigan Naval Architecture and Marine Engineering department. He is a member of the SP-4 (Design/Production Integration) Panel and has performed a number of recent projects for the Panel, including the COMPUTER AIDED SHELL DEVELOPMENT - IS THERE A PROBLEM OR NOT?, BUILD STRATEGY DEVELOPMENT and the U.S. SHIPBUILDING TECHNOLOGY SURVEY. He was part of the BIW SP-8 Panel Concurrent Engineering project team and prepared the CE PRIMER and CE USER'S GUIDE. He also organized and facilitated the CE Workshop in June 1995.

## COURSE SCHEDULE

The schedule for the four courses to be presented in Newport News at Newport News Shipbuilding is:

COURSE	DATES
1. Design for Production	Jan 31-2, 1996
2. Modern Commercial Ship	Nov 15-17, 1996
3. Implementation of Advanced Technology	Mar 4-5, 1996

## SHORT COURSE PROGRAM

### 1. DESIGN FOR PRODUCTION INTEGRATION INSTRUCTOR: Tom Lamb

#### WEDNESDAY, JANUARY 31, 1996

MORNING 8am-12pm  
Introduction  
Paradigm Shifts  
World Shipbuilding Markets, Demand & Supply  
Productivity  
Need for Change  
AFTERNOON 1pm-4.30pm  
Production Engineering  
Shipbuilding Policy  
Build Strategy

#### THURSDAY, FEBRUARY 1, 1996

MORNING 8am-12pm  
Group Technology  
Product Work Breakdown Structure  
Design/Production Integration  
AFTERNOON 1pm-4.30pm  
DFP in Contract Design, Basic & Detailed Design  
Shipbuilding Case Study

#### FRIDAY, FEBRUARY 2, 1996

MORNING 8am-12pm  
Management of Change  
What to Change  
Barriers to Change  
AFTERNOON 1pm-4.30pm  
Useful Techniques and Tools  
Shipbuilding Case Study

### 2. MODERN COMMERCIAL SHIP PRODUCTION INSTRUCTOR: Tom Lamb

#### WEDNESDAY, NOVEMBER 15, 1995

MORNING 8am-12pm  
Ship Production/Repair History  
Trends in New Construction & Repair  
Shipyard Management Theory  
Shipbuilding Policy  
AFTERNOON 1pm-4.30pm  
Shipbuilding Processes

#### THURSDAY, NOVEMBER 16, 1995

MORNING 8am-12pm  
General Concepts of Advanced Mfg.  
Introduction of Group Technology  
AFTERNOON 1pm-4.30pm  
Block Construction  
Advanced Outfitting  
Block & Zone Construction  
Ship Repair/Modification Applications

#### FRIDAY, NOVEMBER 17, 1995

MORNING 8am-12pm  
Production Planning & Control  
Material Control  
Concepts of Standardization  
AFTERNOON 1pm-4.30pm  
Dimensional Control & Accuracy Control  
Experience Curve Effects  
Causes and Effects of Disruption

### 3. IMPLEMENTATION OF ADVANCED TECHNOLOGY INSTRUCTOR: Tom Lamb

#### THURSDAY, MARCH 4, 1996

MORNING 8am-12pm  
World Shipbuilding Situation  
U.S. Shipbuilding Situation  
Shipbuilding Competitiveness  
What is "World Class"  
AFTERNOON 1pm-4.30pm  
Seamless Enterprises  
Cross-functional Management  
Virtual Organizations  
Re-engineering

#### FRIDAY, MARCH 5, 1996

MORNING 8am-12pm  
Integrated Product & Process Development  
Cross-functional Development Teams  
AFTERNOON 1pm-4.30pm  
Team Dynamics  
Team Leadership  
Team Facilitation  
Putting it all together

THE NATIONAL SHIPBUILDING  
RESEARCH PROGRAM

# SHORT COURSES FOR SHIPYARD MANAGERS AND WORKERS

DESIGN FOR PRODUCTION  
INTEGRATION

MODERN COMMERCIAL SHIP  
PRODUCTION

IMPLEMENTATION OF  
ADVANCED TECHNOLOGY

IN

**NEWPORT NEWS**

Sponsored by SNAME  
Ship Production Committee SP-9  
(Education and Training) Panel

## INVITATION AND BACKGROUND

*The U.S. shipbuilding industry is at an important cross road as it prepares to enter the 21st century. Navy shipbuilding orders are declining and are insufficient to maintain the current level of shipbuilding. At the same time it appears that the demand for commercial ships is improving to the level where commercial shipbuilding may offer a profitable alternative to Navy shipbuilding for U.S. shipbuilders.*

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*In addition, both the NSRP Ship Production Symposium and the SNAME Annual Meeting transactions contain papers based on the NSRP Panel projects.*

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*This brochure is your invitation to attend one or all of these short courses. We hope you will take advantage of this unique opportunity.*

## SHORT COURSE VENUE

Newport News Shipbuilding has kindly offered to hold the courses in their shipyard training facility in Newport News. Space limits attendance to 25 attendees, so please register as soon as possible.

## SHORT COURSE SPONSOR

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## SHORT COURSE CONTENT

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## COURSE SCHEDULE

The schedule for the four courses to be presented in Newport News at Newport News Shipbuilding is:

COURSE	DATES
1. Design for Production	Nov 29-Dec 1, 1995
2. Modern Commercial Ship	Dec 13-15, 1995
3. Implementation of Advanced Technology	April 18-19, 1996

## SHORT COURSE PROGRAM

### 1. DESIGN FOR PRODUCTION INTEGRATION INSTRUCTOR: Tom Lamb

#### WEDNESDAY, NOVEMBER 29, 1995

MORNING 8am-12pm  
Introduction  
Paradigm Shifts  
World Shipbuilding Markets, Demand & Supply  
Productivity  
Need for Change  
AFTERNOON 1pm-4.30pm  
Shipbuilding Practices  
Ship Design and Production Processes  
Production Engineering  
Shipbuilding Policy  
Build Strategy

#### THURSDAY, NOVEMBER 30, 1995

MORNING 8am-12pm  
Group Technology  
Product Work Breakdown Structure  
Design/Production Integration  
AFTERNOON 1pm-4.30pm  
DFP in Contract Design, Basic & Detailed Design  
Shipbuilding Case Study

#### FRIDAY, DECEMBER 1, 1995

MORNING 8am-12pm  
Management of Change  
What to Change  
Barriers to Change  
AFTERNOON 1pm-4.30pm  
Useful Techniques and Tools  
Shipbuilding Case Study

### 2. MODERN COMMERCIAL SHIP PRODUCTION INSTRUCTOR: Tom Lamb

#### WEDNESDAY, DECEMBER 13, 1995

MORNING 8am-12pm  
Ship Production/Repair History  
Trends in New Construction & Repair  
Shipyards Management Theory  
Shipbuilding Policy  
AFTERNOON 1pm-4.30pm  
Shipbuilding Processes

#### THURSDAY, DECEMBER 14, 1995

MORNING 8am-12pm  
General Concepts of Advanced Mfg.  
Introduction of Group Technology  
AFTERNOON 1pm-4.30pm  
Block Construction  
Advanced Outfitting  
Block & Zone Construction  
Ship Repair/Modification Applications

#### FRIDAY, DECEMBER 15, 1995

MORNING 8am-12pm  
Production Planning & Control  
Material Control  
Concepts of Standardization  
AFTERNOON 1pm-4.30pm  
Dimensional Control & Accuracy Control  
Experience Curve Effects  
Causes and Effects of Disruption

### 3. IMPLEMENTATION OF ADVANCED TECHNOLOGY INSTRUCTOR: Tom Lamb

#### THURSDAY, APRIL 18, 1996

MORNING 8am-12pm  
World Shipbuilding Situation  
U.S. Shipbuilding Situation  
Shipbuilding Competitiveness  
What is "World Class"  
AFTERNOON 1pm-4.30pm  
Seamless Enterprises  
Cross-functional Management  
Virtual Organizations  
Re-engineering

#### FRIDAY, APRIL 19, 1996

MORNING 8am-12pm  
Integrated Product & Process Development  
Cross-functional Development Teams  
AFTERNOON 1pm-4.30pm  
Team Dynamics  
Team Leadership  
Team Facilitation  
Putting it all together

THE NATIONAL SHIPBUILDING  
RESEARCH PROGRAM

# SHORT COURSES FOR SHIPYARD MANAGERS AND WORKERS

QUALITY FUNCTION  
DEPLOYMENT

DESIGN FOR PRODUCTION  
INTEGRATION AND

MODERN COMMERCIAL SHIP  
PRODUCTION AND  
IMPLEMENTATION OF  
ADVANCED TECHNOLOGY

ZONE TECHNOLOGY FOR SHIP  
REPAIR AND OVERHAUL

IN

## SEATTLE

Sponsored by SNAME  
Ship Production Committee SP-9  
(Education and Training) Panel

### INVITATION AND BACKGROUND

*The U.S. shipbuilding industry is at an important cross road as it prepares to enter the 21st century. Navy shipbuilding orders are declining and are insufficient to maintain the current level of shipbuilding. At the same time it appears that the demand for commercial ships is improving to the level where commercial shipbuilding may offer a profitable alternative to Navy shipbuilding for U.S. shipbuilders.*

*To do this U.S. shipbuilders must change many of their current practices. Many shipbuilders have been on this difficult road for some time but many are just starting.*

*To help accomplish this difficult journey, the National Shipbuilding Research Program Panels have developed and recorded, in their reports, many of the steps that will need to be taken, by the projects undertaken by the Panels.*

*In addition, both the NSRP Ship Production Symposium and the SNAME Annual Meeting transactions contain papers based on the NSRP Panel projects.*

*Also the University of Michigan has included many of the practices in their undergraduate and graduate courses as well as in short courses given to Navy personnel and to the industry in general. Although many people in the U.S. shipbuilding industry receive the NSRP Reports and distribute them to others in their company and some shipbuilders use them in their in-house training programs, there is still a large group of shipbuilding personnel who have not had the opportunity to avail themselves of this knowledge.*

*With this in mind the SP-9 Panel is sponsoring the presentation of these short courses to shipbuilders and others in the industry to help the wider dissemination and understanding of the practices contained therein.*

*This brochure is your invitation to attend one or all of these short courses. We hope you will take advantage of this unique opportunity.*

### SHORT COURSE VENUE

Todd Pacific Shipyard Corp. have kindly offered to hold the courses in their shipyard on Harbor Island. Space limits attendance to 40 attendees, so please register as soon as possible.

### SHORT COURSE SPONSOR

The NSRP SP-9 (Education and Training) Panel is the sponsor of the Short Courses. Mr. Thomas Lamb, A Research Scientist at UMTRI is the project director.

### SHORT COURSE CONTENT

The QFD and Modern Commercial Ship Production courses are upgraded short courses presented at UMTRI, NAVSEA and a number of shipyards in the U.S. over the past few years. The Design for Production Integration course is based on new courses being developed for the new U of M NAME Concurrent Marine Design program. The Ship Repair Zone Technology course is a new course.

**ATTENDANCE WILL BE LIMITED  
TO 40 ATTENDEES, FIRST COME,  
SO PLEASE**

**REGISTER EARLY!**

**PLEASE PASS THIS  
BROCHURE ON TO  
OTHERS WHO MAY BE  
INTERESTED.**

## SHORT COURSE INSTRUCTORS

Mr. Mark Spicknall is a Research Associate at UMTRI with 5 years experience, specializing in Shipbuilding Process Analysis and Build Strategy. Prior to joining UMTRI Mark worked at Newport News Shipyard. Mark has his B.S. degree in Naval Architecture and Marine Engineering and is currently studying for his MBA.

Mr. Thomas Lamb recently joined UMTRI as a Research Scientist and provides education in Ship Production Technology at University of Michigan Naval Architecture and Marine Engineering department. He is a member of the SP-4 (Design/Production Integration) Panel and has performed a number of recent projects for the Panel, including the COMPUTER AIDED SHELL DEVELOPMENT - IS THERE A PROBLEM OR NOT?, BUILD STRATEGY DEVELOPMENT and the U.S. SHIPBUILDING TECHNOLOGY SURVEY. He was part of the BIW SP-8 Panel Concurrent Engineering project team and prepared the CE PRIMER and CE USER'S GUIDE. He also organized and facilitated the CE Workshop in June 1995.

## COURSE SCHEDULE

The schedule for the four courses to be presented in Seattle at Todd Pacific Shipyard Corp is:

COURSE	DATES
1. Quality Function Deployment	Oct 19-20, 1995
2. Design for Production	Nov 8-10, 1995
3. Modern Commercial Ship and Implementation of Advanced Technology	Feb 28-Mar 1, 1996
4. Zone Technology for Ship Repair and Overhaul	Apr 25-27, 1996

## SHORT COURSE PROGRAM

### 1. QUALITY FUNCTION DEPLOYMENT INSTRUCTORS: Mark Spicknall and Tom Lamb

#### THURSDAY, OCTOBER 19, 1995

MORNING 8am-12pm  
 Introductions  
 Basic Concepts of QFD  
 AFTERNOON 1pm-4.30pm  
 The House of Quality  
 Interpretation of the House of Quality

#### FRIDAY, OCTOBER 20, 1995

MORNING 8am-12pm  
 The Voice Of the Customer  
 Other QFD Matrices  
 AFTERNOON 1pm-4.30pm  
 Shipbuilding Case Studies  
 Wrap-up

### 2. DESIGN FOR PRODUCTION INTEGRATION INSTRUCTOR: Tom Lamb

#### WEDNESDAY, NOVEMBER 8, 1995

MORNING 8am-12pm  
 Introduction  
 Paradigm Shifts  
 World Shipbuilding Markets, Demand & Supply  
 Productivity  
 Need for Change  
 AFTERNOON 1pm-4.30pm  
 Shipbuilding Practices  
 Ship Design and Production Processes  
 Production Engineering  
 Shipbuilding Policy  
 Build Strategy

#### THURSDAY, NOVEMBER 9, 1995

MORNING 8am-12pm  
 Group Technology  
 Product Work Breakdown Structure  
 Design/Production Integration  
 AFTERNOON 1pm-4.30pm  
 DFP in Contract Design  
 DFP in Basic Design  
 DFP in Detailed Design  
 Shipbuilding Case Study

#### FRIDAY, NOVEMBER 10, 1995

MORNING 8am-12pm  
 Management of Change  
 What to Change  
 Barriers to Change  
 AFTERNOON 1pm-4.30pm  
 Useful Techniques and Tools  
 Shipbuilding Case Study

### 3. MODERN COMMERCIAL SHIP PRODUCTION AND IMPLEMENTATION OF ADVANCED TECHNOLOGY INSTRUCTOR: Tom Lamb

#### WEDNESDAY, FEBRUARY 28, 1996

MORNING 8am-12pm  
 Ship Production/Repair History  
 World Class Shipbuilding Practices  
 Shipbuilding Policy  
 AFTERNOON 1pm-4.30pm  
 Shipbuilding Processes  
 Block Construction  
 Advanced Outfitting

#### THURSDAY, FEBRUARY 29, 1996

MORNING 8am-12pm  
 Block and Zone Construction  
 World Class Shipbuilding Practices  
 Shipbuilding Policy

AFTERNOON 1pm-4.30pm  
 Production Planning & Control  
 Material Control  
 Dimensional Control  
 Accuracy Control

#### FRIDAY, MARCH 1, 1996

MORNING 8am-12pm  
 World Shipbuilding Situation  
 U.S. Shipbuilding Situation  
 Shipbuilding Competitiveness  
 What is "World Class"  
 AFTERNOON 1pm-4.30pm  
 Seamless Enterprises  
 Virtual Organizations  
 Re-engineering  
 Integrated Product and Process Development  
 Cross-functional Development Teams  
 Putting it all together

### 4. ZONE TECHNOLOGY FOR SHIP REPAIR AND OVERHAUL INSTRUCTOR: Tom Lamb

#### WEDNESDAY TO FRIDAY, APRIL 25-27, 1996

This course is still being developed at this time. It will consist of a series of presentations covering the application of Zone Technology to Ship Repair and Overhaul. Six actual case analysis from both the naval and commercial sectors of the ship repair industry of zone technology applied applications will be covered including successes and failures and the lessons learned. Tentative contents of the course are:

- Life Cycle of a Ship
- Review of Processes of Ship Repair & Overhaul
- Introduction to Zone Technology
- Planning & Scheduling
- New Design & Construction requirements to promote Zone Technology application
- PWBS and Build Strategy for Ship Repair



# **APPENDIX C**

## **COURSE AGENDA**

Course Outline

DAY 1	Start	Duration
Welcome and Introductions	8:30	0:20
Course Objectives		
Course Schedule		
Overview of Facilities		
<u>Section I</u>		
Preview of Tape #1, Overview of QFD	8:50	0:05
Viewing of Tape #1	8:55	0:30
Discussion of Basic QFD Concepts	9:25	0:30
Break	9:55	0:15
Preview of Case Study Tape, Rockwell	10:10	0:05
Viewing of Case Study Tape	10:15	0:20
Discussion of Case Study Tape	10:35	0:20
Review of Material Covered Thus Far	10:55	0:15
Lunch	11:10	12:10
<u>Section II</u>		
Preview of Tape #2, The House of Quality	12:10	0:10
Viewing of Tape #2	12:20	0:40
Affinity & Tree Diagrams, House of Quality	1:00	0:25
Break	1:25	0:15
<u>Case Study #1, Section V</u>		
Shipbuilding Case Study #1 For Entire Class		
Establishment of QFD Procedural Ground Rules	1:40	0:15
Creation of Customer Requirements, Product/Service Requirements	1:55	1:30
Break	3:25	0:15
Interpretation of the House of Quality	3:40	0:30
Relationships of Customer Requirements and Product Requirements, Degrees of importance of individual Customer Requirements, Importance weights for individual Product Requirements, Competitive Advantages, High priority customer requirements, Correlation Matrix		
Overview of Case Study #1 and Day 1	4:10	0:50
Adjourn	5:00	
DAY 2		
Review of Day 1	8:00	0:30

Section III

Preview of Tape #3, The Voice Of The Customer	8:30	0:10
Viewing of Tape #3	8:40	0:25
Discussion of Tape #3	9:05	0:15

Break	9:20	0:15
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Demonstration of the Voice Of The Customer Table	9:35	0:30
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Detailed Case Studies Begin. Section V

Shipbuilding Case Studies For Individual Teams	10:05	12:00
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Creation of QFD Teams,  
Review of QFD Procedural Ground Rules,  
Review of individual shipbuilding case studies by each team,  
Representation of Voices Of The Customer by team members,  
Creation of Voice Of The Customer Table

Lunch	12:00	1:00
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Customer Requirements and Product Requirements,	1:00	3:30
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Creation of the House of Quality/Product Planning Matrix,  
Interpretation of the information in the House Of Quality

Review of Day 2	4:30	0:30
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Adjourn	5:00	
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DAY 3

Review of Day 2	8:00	0:30
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Section IV

Preview of Tape #4, The Phases of QFD	8:30	0:05
Viewing of Tape #4	8:35	0:35
Discussion of Tape #4	9:10	0:20

Break	9:30	0:15
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Section V. Detailed Case Studies Complete

Continuation of Individual Team Case Studies	9:45	1:45
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Completion of House of Quality/Product Planning Matrix

Creation of a Product Design Matrix

Creation of a Process Planning Matrix

Creation of a Process Control Planning Matrix

Course Wrap-Up and Evaluations	11:30	0:30
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End Of Workshop

## FIRST DAY AGENDA

8 - 8.30 AM	INTRODUCTIONS
8.30 - 8.45 AM	WORKSHOP OBJECTIVES
8.45 - 9.30 AM	PARADIGM SHIFT
<b>9.30 - 10.00 AM</b>	<b>BREAK</b>
10.00 - 11.00 AM	WORLD SHIPBUILDING MARKETS
11.00 - 11.30 PM	EXERCISE 1 - Selection of Ship Type
<b>11.30 AM - 12.30 PM</b>	<b>LUNCH</b>
12.30 - 1.15 PM	PRODUCTIVITY
1.15 - 2.00 PM	COMPETITIVENESS
<b>2.00 - 2.15 PM</b>	<b>BREAK</b>
2.15 - 3.15PM	EXERCISE 2 - CGT/Manhours OR Cost Breakdown
3.15 - 4.00PM	NEED FOR CHANGE

## SECOND DAY AGENDA

8 - 8.30 AM	FIRST DAY REVIEW
8.30 - 9.15 AM	PRODUCTION ENGINEERING
9.15 - 9.45 AM	GROUP TECHNOLOGY
<b>9.45 - 10.00 AM</b>	<b>BREAK</b>
10.00 - 10.30 AM	SHIPBUILDING POLICY AND BUILD STRATEGY
10.30 - 11.00 AM	PRODUCT WORK BREAKDOWN STRUCTURE
11.00 - 11.30 AM	EXERCISE 3 - Coding
<b>11.30 AM - 12.30 PM</b>	<b>LUNCH</b>
12.30 - 1.30 PM	DESIGN FOR PRODUCTION IN BASIC DESIGN
1.30 - 2.15 PM	DESIGN FOR PRODUCTION IN DETAILED DESIGN
<b>2.15 - 2.30 PM</b>	<b>BREAK</b>
2.30 - 3.00 PM	DESIGN FOR PRODUCTION IN DETAILED DESIGN
3.00 - 3.45 PM	EXERCISE 4 - Team Debate on DFP
3.45 - 4.00pm	WRAP-UP

C-4

## FIRST DAY AGENDA

8 - 8.30 AM	INTRODUCTIONS
8.30 - 8.45 AM	WORKSHOP OBJECTIVES
8.45 - 9.30 AM	SHIP PRODUCTION HISTORY - Video & Discussion
<b>9.30 - 10.00 AM</b>	<b>BREAK</b>
10.00 - 11.00 AM	MODERN SHIPBUILDING PROCESSES
11.00 - 11.30 AM	MATERIAL FLOW
<b>11.30 AM - 12.30 PM</b>	<b>LUNCH</b>
12.30 - 1.45 PM	HULL BLOCK CONSTRUCTION AND ZONE OUTFITTING
1.45 - 2.30 PM	EXERCISE 1 - Block Breakdown or Zone Coding
<b>2.30 - 2.45 PM</b>	<b>BREAK</b>
2.45 - 3.30 PM	ADVANCED OUTFITTING
3.30 - 4.00 PM	EXERCISE 2 - Benefit of Advanced Outfitting

MODERN SHIP PRODUCTION SHORT COURSE

## SECOND DAY AGENDA

8 - 8.30 AM	FIRST DAY REVIEW
8.30 - 9.15 AM	PRODUCTION PLANNING & SCHEDULING
9.15 - 9.45 AM	EXERCISE 3 - CPM
<b>10.00 - 10.15 AM</b>	<b>BREAK</b>
10.15 - 11.00 AM	PRODUCTION CONTROL
11.00 - 11.30 AM	MATERIAL CONTROL
<b>11.30 AM - 12.30 PM</b>	<b>LUNCH</b>
12.30 - 1.30 PM	DIMENSIONAL CONTROL
1.30 - 2.15 PM	ACCURACY CONTROL
<b>2.15 - 2.30 PM</b>	<b>BREAK</b>
2.30 - 3.00 PM	LEARNING AND EXPERIENCE EFFECTS
3.00 - 3.45 PM	EXERCISE 4 - Team Debate on use of Best Practices
3.45 - 4.00pm	WRAP-UP

## AGENDA - THURSDAY, MARCH 21, 1996

8 - 8.15 AM	INTRODUCTIONS	
8.45 - 9.15 AM	SETTING THE STAGE -	WORLD SHIPBUILDING
9.15 - 9.45 AM		SHIPBUILDING COMPETITIVENESS
9.45 - 10.00 AM	EXERCISE - CGT	
10.00 - 10.15 AM	BREAK	
10.15 - 10.30 AM		U.S. SHIPBUILDING
10.30 - 11.00 AM		TECHNOLOGY TRANSFER.
11.00 - 11.30 PM		WHAT IS WORLD CLASS
11.30 AM - 12.30 PM	LUNCH	
12.30 - 1.00 PM	EXERCISE - U.S. VERSUS FOREIGN COST BREAKDOWN	
1.00 - 1.30 PM	THE CANDY STORE -	TOTAL QUALITY MANAGEMENT
1.30 - 2.00 PM		SEAMLESS ENTERPRISES
2.00 - 2.15 PM	BREAK	
2.15 - 2.45 PM		RE-ENGINEERING
2.45 - 3.00 PM		BUSINESS PROCESS RE-ENGINEERING
3.00 - 3.30 PM		VIRTUAL ORGANIZATIONS
3.30 - 4.00PM	EXERCISE	

IMPLEMENTING ADVANCED TECHNOLOGY SHORT COURSE



## AGENDA - FRIDAY, MARCH 22, 1996

8 - 8.15 AM	THURSDAY REVIEW	
8.15 - 9.00 AM	MANAGING CHANGE -	UNDERSTANDING CHANGE BARRIERS TO CHANGE HOW TO INCREASE YOUR CHANCE OF SUCCESS
9.00 - 9.30 AM	EXERCISE	
9.30 - 10.00 AM	THE TOOLS -	UNDERSTANDING VARIATION
<b>10.00 - 10.15 AM</b>	<b>BREAK</b>	
10.15 - 10.45 AM		ACTIVITY BASED COSTING
10.45 - 11.30 AM		CONCURRENT ENGINEERING - IPPD
<b>11.30 AM - 12.30 PM</b>	<b>LUNCH</b>	
12.30 - 1.00 PM	EXERCISE - CE READINESS	
12.30 - 2.15 PM	TEAMS AND TEAMWORK	
2.15 - 2.45 PM	EXERCISE	
<b>2.45 - 3.00 PM</b>	<b>BREAK</b>	
3.00 - 3.45 PM	STRATEGY FOR IMPLEMENTING AT IN U.S. SHIPBUILDING	
3.45 - 4.00 PM	WRAP-UP	

# **APPENDIX D**

## **ATTENDEE FEEDBACK**

## **COURSE EVALUATION**

We would be very grateful for your feedback on the course. Please complete this evaluation form and return it at the end of the course. Two copies are provided so that you can keep a copy of your evaluation. Thank you!

**THE MOST HELPFUL THINGS I LEARNED FROM THE COURSE ARE:**

- 1.
- 2.
- 3.

**WHAT I LIKED BEST ABOUT THE COURSE WAS:**

**WHAT I DISLIKED MOST ABOUT THE COURSE WAS:**

**RECOMMENDATIONS FOR FUTURE COURSES**

**ANY OTHER COMMENTS?**

**NAME (OPTIONAL)**

(blank)

Design for Production Integration

Scheduled Attendees: 21

Bath

Actual Attendees: 19

**The Most Helpful Things I Learned From The Course Are:**

Importance of shipbuilding policy and build strategy. The need for continuous communication between an individual and his customer. Take the time to do up front planning.

Understanding of paradigm and breaking it down. History of shipbuilding and understanding of commercial market. Better understanding of productivity and construction of hulls.

A lot of the information was over my head. I've been part of production for 17 years and the material was not needed.

Reminder of the importance of producible designs. Importance of keeping an open mind when my paradigms are questioned/threatened. Awareness of production personnel's view of "engineering" are uncooperative and out of touch.

DFP hits home very much on the majority of our problems here at BIW. About paradigms.

The need for change. How to remove barriers. How deep the change should be and how to look at it to do the correct change.

Manhole sizes, try to change for future ships at BIW. Build strategy, concurrent engineering uses same process definition. Group technology process lanes eliminate bottlenecks, although heard this before but here a better understanding now of group technology as a whole.

A perspective of where we are as a company. A need to continually review our process. We are not alone.

Road blocks that are met when trying to implement CE. How BIW believes they are working in a CE environment but after the course it does not appear that way. How BIW has to continually observe its process and change the process in order to improve production ability to conduct its business effectively.

Need to re-think traditional approaches to build ships. Awareness of US shipbuilding vs world shipbuilding.

Definition of design of production engineering. Coding and classification of work product/shipbuilding policy. Product based costing/CGT measurement of product.

DFP philosophy/purpose/benefits. Production/engineering interaction.

Some DFP ideas that weren't so obvious/awareness of DFP. Things that must change to implement DFP. BIW does not have "real" concurrent engineering.

We need to change from department optimization to company optimization. Better understanding of what to look for when designing.

Where US shipyards stand among world shipbuilding - reality of the situation we are in. Basic structural design changes for easier production. Awareness that learning/change is needed continually.

All areas covered are topics that I have already had exposure to or training and education for.

Design for Production Integration

Scheduled Attendees: 21

Bath

Actual Attendees: 19

**The Most Helpful Things I Learned From The Course Are:**

New areas to look at in my current position as a concurrent engineer outside of my background or speciality.

Video on paradigms. Discussions with others within the group. Discussion in managing change.

How shipyards estimate work power manning especially on commercial ships. Shipbuilding methods of other yards and how we might do them here at BIW. The real importance of teaming.

Design for Production Integration  
Bath

Scheduled Attendees: 21  
Actual Attendees: 19

**What I Liked Best About The Course Was:**

Other people's input and their thoughts.

Discussion among other BIW employees (Friday's discussions mostly).

The people I met through the course were great. I made new friends and discovered new contacts about shipbuilding.

Introduction to the fundamental philosophy of DFP.

It helped me discover where to look within BIW to find the root cause of our major problems.

The section on need for change, what the options are to change.

Segment on change and focusing more on BIW situations. Totally accurate depiction, parallels projects I am a team leader on. The change impacts a large segment of eng. and production so accomplishments happen slowly.

The overview of how change is necessary in the industry.

Day 3 - need for change! Very interested in Noel Tichy's concepts. Breaking the work environment into 3 categories is an interesting technique.

Solutions on building team between engineering and production.

Focus on design engineering - production interface.

How to approach a change. Need for change section.

Discussion of barriers to DFP implementation.

Interactive projects/breaking into teams.

Examples of actual situations from personal experiences. Slides of "real" packages, dialog of actual occurrences.

N/A

Class interaction or exercises.

Though many of the topics covered were on commercial shipbuilding and out of my sphere of control, I found the exposure to the general industry and what needed to be accomplished to compete in it interesting.

The world shipbuilding market. Possibilities of product staging.

Design for Production Integration

Scheduled Attendees: 21

Bath

Actual Attendees: 19

**What I Disliked Most About The Course Was:**

Some of the exercises were not really relevant to DFP. Exercise 3 coding and exercise 6 team decision seemed out of context with the rest of the presentation.

The organization of subject matter handouts pace was extremely fast and broad at times.

It wasn't material that a deck plate person could understand, high school education was not enough.

Emphasis on DFP for commercial applications. Also the first days explanation of productivity measures seemed more detailed/lengthy than necessary.

The second day of this course was geared toward designing and only dealing with commercial shipbuilding.

Wed. & Thurs. did not pertain to BIW and the things we are doing today. It was hard to link to Navy ships what was being presented.

Too commerical ship-orientated, too much background (measurement of performance), too many examples understanding a point had to be gotten across, some irrelevant and known materials covered. Although some points were interesting at times I felt I was the wrong audience.

To much detail in some areas.

The course read very smoothly. Time actaully flew by. I'm not a big "class room" individual but I had no trouble sitting in on this program.

Not sure how all content related to job.

Lack of actual shipyard implementations (how did other shipyards get here).

N/A

The 50,000 ft. level of day one's discussion.

Long sessions without breaks. Handouts were horrible (not clear and did not follow instructor).



Design for Production Integration  
Bath

Scheduled Attendees: 21

Actual Attendees: 19

**What I Disliked Most About The Course Was:**

Philosophy/historical dissertations.

It appeared to be geared to people who are not in the shipbuilding industry. We have a high knowledge level already.

Too lengthy on the history/background of shipbuilding. This area should be condensed.

Most of the examples dealt with commercial shipbuilding, the course could have been of greater benefit if it had been tailored toward our situation.

Dislike is a harder term then I would use. I thought that the comment of "product models, CAD, and computers will make it all easier" was true but general, since the success of this idea is still interesting and without quantitatious results (product models were my life previously).

Design for Production Integration  
Bath

Scheduled Attendees: 21

Actual Attendees: 19

**Recommendations For Future Courses:**

Try to tailor the course discussion to the students background.

Trim course down to audience need.

Be much more specific about what kind of talent you need to attend your classes, if the right people don't attend you're beating a dead horse.

Include more auxiliary systems, distributive systems in examples and discussions. Most of the discussion applied to structural design.

Try to gear the course material to our line of business, combatant ship.

The 3rd day agenda should be by itself as it can be used in all companies as the 1st two days related to commercial shipbuilding and was very hard to relate to as we are not building commercial ships.

Class should consist of more design reps/apprentices and limited shipyard experience people. I think they would get more out of day 1 & 2. If not go into much detail. More material was generic and high level.

Get out of the weeds and assess the level of knowledge of the class.

Remain as enthusiastic about this course in the future, and I see nothing but success. Really this course is upper management.

Need more interactive role playing and workshops.

Design for Production Integration  
Bath

Scheduled Attendees: 21

Actual Attendees: 19

**Recommendations For Future Courses:**

Focus on how to implement DFP along with what it is. Introduction of modern DFP technology and companies using them.

Try to get some upper management, more engineerings, planning, materials attendees.

Show more actual design changes which improved production. More actual solutions which may be applicable to our needs.

Learn more about shipyard and level of knowledge of class attendees. Then focus the class to more specific areas and methods/tools for them to put to use. This info can be requested from the shipyard.

Spend more time and exercises on examples of designing for production. Examples of the fundamental misunderstanding of interference-free design. True geometry vs production capability to build.

Much of the first two days was high level company policy topics. The wrong audience was present. Should be directed to VPs and directors. Many present were in agreement with changing what we do but have no control over making changes in company policy, i.e. creating shipbuilding policy or setting up concurrent engineering teams. Friday discussion was more lively and pertinent as topics were at a level the participants had some control over and related to BIW. The first day were subjects that we have no control over more company policy and related to commercial shipbuilding which has been determined a direction BIW will not take.

Middle management needs to attend since some of them don't want to bother with DFP since they "are currently successful why change?" and "I'm retiring soon and don't want to change!" Seeing it would help change their minds.

Design for Production Integration  
Bath

Scheduled Attendees: 21

Actual Attendees: 19

**Any Other Comments?:**

Too much time spent explaining CGT. Excellent background info.

Overall found the course informative. I found out new processes and reinforced already used methods.

Mr. Lamb is a very educated teacher and his world travels have made him a good presenter, with the right people & Mr. Lamb a lot can be learned.

Course should be presented to middle managers and design personnel. DFP has relatively little impact on functional design.

Fully believe in DFP and CE in any way, shape, or form.

Tom, thank you for teaching the program. The 3 days spent was well worth my time. I hope it was yours. BIW should work hard to implement these ideas.

I enjoyed the descriptions of change management and state of the industry descriptions.

Good interaction between various disciplines with-in the company - generalized perception of each other which needs changes.

Instructor was very knowledgable and I enjoyed listening to him but I was left yearning for more indepth details.

Start the course with more interaction of your class through brainstorming what they percieve the meaning of designing for production means. Hang these comments around the room and either disprove or prove/support these comments. The brainstorming may give you some new ideas to expand your knowledge and what you can share with others.

Mr. Lamb is very intelligent with great insight.

Design for Production Integration

Scheduled Attendees: 14

Mobile

Actual Attendees: 8

**The Most Helpful Things I Learned From The Course Are:**

Build Policy. Build Strategy. Importance of total yard collaboration.

Need for build strategy. Design for production-Interface between production and Eng. Must change to become world class, do not have paradigm paralysis.

Ways of doing advance planning. Understanding of what the eng. should look for in design short cuts. Being open-minded and looking at everything for our projects

Team work. Different dept. working on the same team. Depts. understanding each other activities.

Design for production. Paradigm shift concept.

Techniques to use to evaluate designs for ease of producibility. Good review on productivity and competition.

The meaning behind group technology. The need for developing a shipbuilding and build strategy. The essential need for eng. which suits production

Production/productivity. Shipbuilding policy/build strategy. Change (how to effect) & paradigm shifts - Note: missed section on DFP.

Design for Production Integration  
Mobile

Scheduled Attendees: 14

Actual Attendees: 8

**What I Liked Best About The Course Was:**

The relative importance of the information to what I do and the Paradigm video.

The number of different topics we touched on and the film on Paradigms.

Speed the information was promised and course moved along really smoothly.

Groups or teams working together.

Overview of design - production integration concept.

Lists & charts provided to implement a build strategy and designing for production.

How engineering, which is production oriented, can help increase efficiency and productivity.

Shipbuilding policy/build strategy (see note above).

Design for Production Integration

Scheduled Attendees: 14

Mobile

Actual Attendees: 8

**What I Disliked Most About The Course Was:**

That the information in the manual were not in order of the discussion.

The atmosphere in which it was held.

The class room, poor lighting and open to noise.

Class room very cold.

Should have been a few more examples of design for production.

Overheads used not organized in handout in order used so notes could be taken during discussions.

The location, very noisy, distracting, cold, poor lighting.

Nothing.

Design for Production Integration  
Mobile

Scheduled Attendees: 14

Actual Attendees: 8

**Recommendations For Future Courses:**

Organize the manual better.

N/A

Have at a different location.

Warm class room, break as intended.

More case histories (examples) for special designs for production, esp. in crafts other than structure (pipe, electric, outfit).

Shorter breaks more often.

Spend more time on GT, PWBS with more hands on exercise.

Much more hands on and/or examples of how to produce designs in a format suitable for production to use & understand effectively (elaborate on DFP more).



Design for Production Integration  
Mobile

Scheduled Attendees: 14  
Actual Attendees: 8

**Any Other Comments?:**

N/A

Really enjoyed course and feel it was very worthwhile. Mr. Lamb was very knowledgeable in all areas of the course.

N/A

N/A

N/A

The group workshops have been the most worth while time I have spent in continuing education since U-M! Good job.

Change location.

The info was very good, well presented, & thought stimulating.

Design for Production Integration

Scheduled Attendees: 29

NASSCO

Actual Attendees: 15

**The Most Helpful Things I Learned From The Course Are:**

Re-assurance from outside sources that what we have/are doing is the correct way to go. That there are more people than I thought (inside and outside company) who share my own ideas. That there are source materials available that may help with implementation of “the design for production”.

Use of build strategy. Paradigm shift. Benefit of class functional teams.

Better perspective on the scope of designing for production. Better understanding of the global shipbuilding market place. The technology is there to make our shipyard a world class shipbuilder, as long as we have the willingness to make it happen.

Look at product orientated WBS. Shipbuilding philosophy and build strategy. Exposure to DFB.

Comparison of US vs Foreign shipyards. Definition of paradigm and ways of achieving paradigm shifts. The world demand for the various types of vessels.

Importance of continuous improvement. Importance of design for production. Effective decisions through group interactions.

CGT - expand into further use. Shipbuilding policy - very important. Group technology - coping for goal. Decision issues - food for thought views. Paradigm effect.

Value of concurrent engineering. Emphasis on design for production. Alternatives to conventional design practices (this should be part of our daily life).

Things to look for to create producible designs. Concept of paradigms.

Importance of policy and build strategies. Importance of selecting a market niche. Implications of production engineering.

Theoretical concepts in design improvement. Importance of upper management commitment. Need for improved communication internally.

Productivity info - how to measure - impact of improvements. Paradigms - recognition of effects need for replacing old. Ways to move forward with needed changes.

World markets. Paradigm shifts. What we can do to be competitive “need shipyard policy”.

Applying techniques learned and actually doing exercises (practice). Overall background of world shipbuilding. Learning from other NASSCO employees (experiences, views, etc.)

Breaking paradigms. Importance of building policy. Importance of design for production. The market.

Design for Production Integration  
NASSCO

Scheduled Attendees: 29

Actual Attendees: 15

**What I Liked Best About The Course Was:**

Information on status of shipbuilding world-wide and possible markets for our company to explore.

It made me think outside the dotted lines.

N/A

N/A

Group participation.

Group interaction. Limited time for group decision making (proves that decision did not need to take excessive amounts of time).

N/A

Design for production i.e. define design to suit most desirable building methods.

Benchmarking of US to foreign competition and paradigm video.

The re-affirmation of the need for design for production. While we are well into the process it is always necessary to keep the focus on the whys and wherefores. The mix of disciplines represented will reinforce the team concepts necessary.

Pre-planned agenda and video presentation.

Thought provoking ideas. Knowledge of the instructor.

Seeing how we compared to rest of world.

Good overall background information on shipbuilding. Exercises were good - helped validate learning.

Seeing all disciplines together discussing design for production and other topics.

Design for Production Integration  
NASSCO

Scheduled Attendees: 29

Actual Attendees: 15

**What I Disliked Most About The Course Was:**

Manual - poorly organized (some hand-outs illegible).

Too much emphasis on steel.

N/A

The customers and listening exercise was complete and often did not show how to better design DFP or how to implement. This was not a Deming (TQL) workshop. Overheads not updated not legible not possible to follow in many cases during lecture.

Viewgraphs difficult to read.

Handout did not follow the presentation. At times, it was very difficult to follow the presenter.

Must coordinate slides/viewgraphs to printed material. Change portion.

Handout material was hard to read (some of material).

The reference material/handouts could have been better organized and reflected the instructors slides better.

NASSCO is well into DFP and process change. Much of the course dealt with reasons and suggestions considered by NASSCO in recent years.

Discontinuity in syllabus from viewgraphs to handouts.

Excess use of structural examples instead of outfitting examples.

A lot of material was outdated and very hard to read.

Handout not user friendly. Several hours very detailed specific skip improvements was too detailed for my level. These sections can be segmented to its appropriate audience. Instructor did not allow audience to get involved.

None.

Design for Production Integration  
NASSCO

Scheduled Attendees: 29  
Actual Attendees: 15

**Recommendations For Future Courses:**

Improve the manual by providing the index, tabs, binder. Chapters of the manual should follow the lecture.

Design for product.

Courses on specific chapters in this course, i.e. "design for production in basic design".

Ensure that the overhead projection slides match the handout and are in the same order. The classification/coding exercise was useless - what was its purpose, what were we supposed to gain from this?

Create a new set of veiwwgraphs summarizing the key points of each section in the course notes.

Use the existing handout with an additional handout for a detailed syllabus.

Need implementation guide.

This or simulation course should be performed periodically to remind people of importance of sharing info and working together.

Require a better mix of departments so that excercises have input from all areas.

While much of the course dealt with subject matter familiar to myself the course as presented is very effective for recent employees and those with limited exposure to the DFP concepts as was the mix today. Get more comfortable chairs.

Possibly different class projects. More related to real-life situations.

Courses focused on trades. What's being done elsewhere? Ideas for change.

Update info and clean up copies. Gear course to where that current shipyard is with respect to DFP.

Handouts need to be more organized. Less use of acronyms or appendix listing common acronyms. Don't need overview read to us - highlight critical data. Exercise on WBS needs work too small to read. Need to allow NASSCO people to comment, everyone (including instructor) learns from this dialog.

Breaking the paradigm of US shipbuilding being unrecognized in commerical shipbuilding world wide.

Design for Production Integration  
NASSCO

Scheduled Attendees: 29

Actual Attendees: 15

**Any Other Comments?:**

More examples on ship outfitting techniques (machinery, electrical) as those activities consume the substantial number of hours.

N/A

More shipyard managers and VPs should take this course.

N/A

N/A

Keep individual presentations, "short and sweet," get more student involvement.

N/A

Possible focus on synchronization of work in engineering departments and support of same by production by defining methods of building early in the process.

This course was very helpful, but I feel most of it will be lost if NASSCO's upper management do not make an effort to develop a build strategy or shipbuilding policy.

N/A

Overall I learned quite a few concepts and enjoyed the class.

Time well spent. Wish the course had been presented to a cross functional team as a part of an implementation plan for DFP not just as a training course.

I believe NASSCO is well on the way with our M.E. group in implementation DFP. I liked the group assignments.

Ask audience for feedback, i.e. how does this work at NASSCO? Overall great information and well worth the time. Would like to see other groups involved too, i.e. marketing, purchasing, etc. Great transfer of information Tom! Thanks!!

NSRP should be more visible to more shipbuilding people.

Design for Production Integration

Scheduled Attendees: 32

Newport News

Actual Attendees: 16

**The Most Helpful Things I Learned From The Course Are:**

Compensated gross ton/mhr calculations.

How NNS ranks with other yards industry wide. Importance of design for production.

Benefits of design for production. Discussions on what other shipyards are doing. Better understanding of the roadblocks to change due to the paradigm effect.

Methods or concepts of design for production. How other shipyards operate. Basic shipbuilding process.

A sense of urgency that we need to make drastic changes if we are going to compete in the commercial market. Ideas on how to successfully work on a team.

The statistics and analysis methods at the beginning of the course. Verbalizing why I believe in designing for production. Meeting others in the company in different areas contributing to the subject effort.

My paradigms were challenged to the point that I will question my views more critically. Some general data given about foreign yards will be helpful to motivate apprentices I teach. As I develop revise the courses I teach I will get more feedback from apprentices/production.

Alternate methods of ship design and construction. A better understanding of such terms as build strategy and compensated gross tonnage. Worldwide market activities, predictions and ideas that must be integrated into USA shipbuilding industry.

Challenges to implementations design for production. Measurement practices for productivity. Historical perspective to "how we are today" in the industry.

Reason for Japanese domination in industry. Learn of existence of support for design emphasis by NSRP. Paradigm awareness.

Size and distribution of world commercial market. Differences in man hours and costs worldwide. Suggestions for details and processes that might save production time (needed more of this).

Different types of produced lines in the international market and the difficulty and ease to penetrate the market. Work breakdown structure and access. Techniques for cost reduction.

Knowledge of various methods of improving fabrication. Paradigms and need for change on a continuous basis. Ways that US can become a world class competitor.

Use of compensated gross tonnage estimating. Paradigm shifts. PODAC use in bidding on future US ships.

Where industry stands (international vs US) with regard to design for production techniques (1st day). Video on paradigm shifts (3rd day). Possible applications of design for production with regard to structural construction (2nd day).

Insight into world market and how to enter. To think toward being a paradigm pioneer. That design for production can start very small with no adjustment to production facility and grow slowly & become a way of life.

Design for Production Integration  
Newport News

Scheduled Attendees: 32  
Actual Attendees: 16

**What I Liked Best About The Course Was:**

Good overview of the International and US markets.

Instructors overall knowledge of the commercial industry.

Instructors vast knowledge of shipbuilding. Debate on design for production benefits, very informative.

Discussions actual examples in the industry on how design for production concepts are used.

The personal insight of the instructor of the shipbuilding industry.

Reinforcement of the facts, organization of my thoughts, practice in "how we'll build it". I liked the attention this subject calls to a necessary change in our company philosophy.

Specific examples which showed the way it was before DFP was considered and how DFP improved the production process.

Design for production basic and detailed design.

Perspective on shipbuilding industry internationally. Presentations were interesting.

Presentation of industry facts, figures conditions internationally.

The breadth of the material presented (this was also a disadvantage for those seeking depth in the design process).

Eng. design for production (i.e. designing shapes for welding)

Sharing information/ideas with other departments within NNS.

Use of exercises (especially the "debate").

Discussion and video about paradigm shifts and its need when facilitating change.

The mix was just right with lecture, video, theory, and papers and examples.



Design for Production Integration

Scheduled Attendees: 32

Newport News

Actual Attendees: 16

**What I Disliked Most About The Course Was:**

More thought provoking then instructional.

Lackof discussion of computer tools to facilitate design for production.

Sometimes acronyms were used that I was not familiar with.

Not long enough.

The handout - it didn't follow the lecture - some wasn't there - and what was there was - is - out of order. Lecture seemed to ramble - attempted to cover too much too fast.

Work packages only give the worker what he needs to know to do his job - the overhead transparencies should do the same thing. Transparencies are too busy and should be developed to reveal things more progressively after each concept is presented there should be an activity which ensures the course participants understand the concept and can apply it. I would appreciate a deeper level of naval architecture explanation (more technical).

One or two topics I felt were, due to unfortunate delays, rushed and some of the info was difficult to grasp during the first two days.

Some terms were not explained. The audience was not all shipbuilders.

Lack of orientation re course content. Mix of specialities of participants somewhat hinders excersises and presentation...questions orginated from non eng. viewpoints.

Particulars of what our international competitors do differently were not presented - what do their designs look like? What do their facilities look like? How were these designs matched to the facilities?

Too technical on day 2. Too much structural component assembly details.

Enjoyed course but due to my lack of knowledge (being from computer center) I was a little lost when dealing with details of structural design (in some exercises on 2nd day), my experience is with machine shops for outfitting.

Design for Production Integration  
Newport News

Scheduled Attendees: 32  
Actual Attendees: 16

**Recommendations For Future Courses:**

At least in E14 we received very little info concerning this type of short course, we would be interested in seeing a list of courses available and providing an input of the number of people interested. The series of courses like this one should be given to improve the professional skills of NNS engineers and designers.

More information on implementation of design for production. More information on how this is being implemented worldwide (especially in Japanese and Korean markets) so we can implement them here.

More group exercises to encourage group participation.

Condense the range or volume - re: organize the handout - expend less time and concern over expectations on course, just do them.

Possibly re-adjust topics on first two days so as not to rush some of initial topics.

More concrete examples of manufacturing documents including more than just drawings.

Prepare participants with more upfront information on course content. See "other comments" below. Relate specific reason for course and stick with it. I was not certain of course content so had to adlib expectations, questions.

Take a particular ship - show for that ship the process that could be used to improve design for a particular given shipbuilding facility - work completely through one ship for one facility.

Design for Production Integration  
Newport News

Scheduled Attendees: 32  
Actual Attendees: 16

**Recommendations For Future Courses:**

Give better explanation of purpose for doing CGT exercise. Don't skip around from one topic to another when presenting info on a particular subject. Do better job at putting notebook together.

More exercises/debates.

Keep video on change and discussion. Maybe address use of design for production in outfitting (which could apply to ship repair also).

Maybe more exercises and on hand involvement with class. With next class please give an outline of the course in detail. The course may be more effective if the participants were all from the same discipline. It seems to me from your comments and my experience lately with the European shipyards that the foremost thing US shipyards need to do is become successful in the Common World Market of shipbuilding is to communicate, cooperate and collaborate within their own yards and even with each other. Think - Team Effort - the whole cost, not just my departmental cost or budget. It seems that DFP may be the hub for the wheel of change. Talk about a paradigm shift.

Design for Production Integration  
Newport News

Scheduled Attendees: 32

Actual Attendees: 16

**Any Other Comments?:**

This course should be given to the process innovation teams. It fits into their charter well. This course should also be given to senior management. For NNS to change they need to have a good handle on the world market, and what it will take to make us competitive.

Excellent overall knowledge of subject, however the topic would probably be best presented to Eng. and Eng management, structural exercises probably not appropriate for this audience.

Enjoyed the course.

I liked what you called your "lengthly stupid" stories.

Every time the instructor said, "As we all know" or "as you know" I had no idea what I was I was suppose to know.

The exercises were good for the most part - it was a good experience overall.

Some of the materials were difficult to read - the copies for future courses should be improved (maybe redone in a less busy - more abbreviated format).

Very impressed with the presenters knowledge and overall presentation of the course.

Make sure all slides are in the handout.

Condense content of presentation and handout to specifics. Utilize less asking for participation and more emphasis on specific points, facts, remedies. More impact may be made by presenting to a cross section of one companies production engineering staff at a time, particularly in use of exercises. I would like to think that I have been designing for production for 20 years. The barriers are  
Overall, good course. Some info on Day 2 could be condensed.

I learned much even though course seemed targeted toward eng. This information is useful through eng. to manufacturing and includes supporting organizations (like computers).

Enjoyed the mix of stories and past experiences from Tom. Keep it up.

Design for Production Integration

Scheduled Attendees: 12

Todd

Actual Attendees: 10

**The Most Helpful Things I Learned From The Course Are:**

Concepts for organizing package units. Focus on design for production.

I learned about paradigms, everything else I had heard about in school. Good to see the actual status of the US shipbuilding and how it compares to other nations. Good to see how different ship types contribute to total demand.

How to encourage the use of paradigm shifts and how to recognise the opportunity to use them. All aspects of DFP. Although much of the practical presentations was not new to me, I enjoyed that aspect of the course as a refresher.

Understanding of new programs Todd is implementing and why they are being done. What design for production is and the benefits associated with DFP. What must be done to stay in business.

The importance of design simplification. (DFP) The need for/obstacles to change methods.

Methods in determining if internal changes are need and how to best implement. Education is available for eng. on how best to design production friendly.

Design - how to have eng. produce effective documentation for production. Process - how process can be used to improve efficiency. Work organization - new process required to be more efficient.

Need for change. World shipbuilding markets. Paradigms/Joel Barker videotape.

I was awakened to the absolute necessity for productivity improvement. Useful ideas for determining the breaks between hull blocks.

Design for Production Integration  
Todd

Scheduled Attendees: 12

Actual Attendees: 10

**What I Liked Best About The Course Was:**

Opportunity to learn from an expert, what is the current state of the US in shipbuilding processes.

Nice manners of the lecturer, obvious knowledge and insight of the industry. Loved the good stories. The seminar gives a good overall picture of DFP.

Team participation on the shipbuilding case study. This provided insight that three good ideas could be presented from the study.

Practical examples. The fact that someone believes in applying DFP, and that it can be done.

The overall view of implementing new techniques into the shipbuilding industry (management, design, construction).

Subject matter and materials. Presentation was done well.

New ideas addressed. Historical review how we got here. Hands on practical ideas on how to fix problems.

Need for change. Plenty of data statistics. Information provided (DFP) that can be used at Todd.

Participants from a variety of backgrounds: design, production, estimating, etc.

Design for Production Integration  
Todd

Scheduled Attendees: 12

Actual Attendees: 10

**What I Disliked Most About The Course Was:**

Discussion of “change management”. I felt this was the wrong forum and wrong teacher for that.

Too much time spent on lecturing.

The cold trailer, the mere fact that Todd provided the facility is much appreciated, however the course must be presented away from shipyard noise and activity. Heater or A/C must be silent.

Facility it was held in. Three days.

Sometimes the information was presented at a pace too rapid to fully digest.

N/A

Seats.

Commercial shipbuilding unfortunately has not been a part of our business so the data while interesting, does not apply at this time.

Occasionally not well focused; however it is a consequence of covering a broad topic.

Design for Production Integration  
Todd

Scheduled Attendees: 12

Actual Attendees: 10

**Recommendations For Future Courses:**

Name tags; leave ten minutes towards end of class to fill out daily log; spend last 15 minutes of class discussing some key concept of modern ship production with instructor acting as moderator; start first day with discussion of who/what is NSRP. This is part of marketing; more concise summaries at end of sections and end of class.

Courses should be more like training courses where attendees solve problems individually or in teams: Write up plan for advanced outfitting of a bilg system for example, plan for zone outfitting of a certain space in a ship, plan for quality control.

More "student" team participation.

Shorten to 2 days.

N/A

Have it off site, so time isn't shared with job responsibilities.

N/A

Applying work organization, radical change, build strategy to focus on DFP for future shipbuilding as well as all work at Todd in general.

More photos.



Design for Production Integration

Scheduled Attendees: 12

Todd

Actual Attendees: 10

**Any Other Comments?:**

Change management discussion was very good, however it was not what was expected by course title and program outline. Case examples and “war stories” should be more specific and focused. Class would be more efficient. I really appreciate the opportunity to attend this class.

I don’t think we should leave out any of the ideas in the seminars, just shorten the lecturing about them. Most of us have heard about them or used them. Would have liked to see even more structural details and comparisons.

The “How-to for the what-to-do” session was interesting from the point of view that it encouraged discussion and counter point, this session should be enlarged upon.

N/A

N/A

I only was in attendance on the last day of instruction.

N/A

Good presentation, thanks Tom.

Good course, priced right, convenient location.

Design for Production Integration  
Washington, DC

Scheduled Attendees: 14

Actual Attendees: 11

**The Most Helpful Things I Learned From The Course Are:**

Paradigm effect. People who break paradigms are outsiders/on the fringe.

Techniques to help out building ships.

Measures of productivity. Competition issues. Shipbuilding markets, demands, and supplies.

Group technology. Shipbuilding policy/build strategy. Product-oriented work breakdown structure.

PWBS. Basic design. "Course pack".

N/A

Competition picuters for American shipbuilders vs forgein. Pictures of designing for production by American shipbuilders vs forgien. Planning used by shipbuilders whether in completing the plan lasted out in course.

Paradigm shift concepts. Need and concepts of build strategy. Interm product catalog concepts and product oriented cubs.

Group technology/PIVISS coping. More design for production ideas. Use of CGT.

PWBS. DFP.

N/A

Design for Production Integration  
Washington, DC

Scheduled Attendees: 14  
Actual Attendees: 11

**What I Liked Best About The Course Was:**

Joel Barker - paradigm shift.

The instructor.

Tom's depth and breadth of knowledge, and his ability to "tell his story."

Concise format and cost.

Bang for the buck, lots of info.

The last part (design for production). The slides were very good and interesting.

Learning about competition and design for production strategies.

Paradigm shift examples.

Design for production.

Class discussions.

N/A

Design for Production Integration  
Washington, DC

Scheduled Attendees: 14  
Actual Attendees: 11

**What I Disliked Most About The Course Was:**

Group technology.

Breaks too far in-between, a 10 minute break every one and a half hours would be fine and half hour for lunch.

Paradigm discussion - this was hard to relate to the stated subject matter.

Too long for some sessions without break.

Quality (readability) of some hand-outs/notes.

N/A

N/A

The discussion on planning is very important yet very dry and painful. Consider another presentation method.

N/A

None.

N/A

Visual quality of the graphics and handouts are poor.

Design for Production Integration  
Washington, DC

Scheduled Attendees: 14

Actual Attendees: 11

**Recommendations For Future Courses:**

Include more up to date information for C.E. and IPPD approach. Add some design examples for outfitting (pipe/elec/vent/ect).

Don't try to squeeze so much info into 2 days - way too crammed together.

More course content and time dedicated to "design for production engineering" and less to management issues and the need for change.

N/A

No - I think the course is well suited.

N/A

Dont forget to give us breaks. I tuned out after about an hour and a half.

More specific topics concerning shipyard costs/prices and proposals would be helpful.

N/A

More time.

Spend more time on DFP integration with the design process. Provide more DFP examples and guidelines.

I would suggest more on production and less on world status of shipyard/industry on the first day.

Design for Production Integration  
Washington, DC

Scheduled Attendees: 14

Actual Attendees: 11

**Any Other Comments?:**

Badly need breaks required after one and half hour.

Based on the title of the course it was not quite what I expected. I expected the entire course to be more like what we did 2nd day in the afternoon. Although, I did enjoy the rest of it, the first day and half was more for managing a shipyard.

Don't let anyone beat the paradigm video out of the course it has value. Thanks.

It seems that the design activity and the build activity need to be one in the same, or at least well familiar. This is typically not the case, at least for naval ships.

Expand the information presented in the second day to cover both days.

Implementing Advanced Technology

Scheduled Attendees: 23

Bath

Actual Attendees: 22

**The Most Helpful Things I Learned From The Course Are:**

A good introduction to activity based costings. Learned of the concepts of TQM. Slightly different view of concurrent engineering. Teaming members was also helpful.

The ABC concept of costing. The industry wide approach (industry specific).

Because we don't cost by activity our costs are not necessarily accurate because managers are held to their budgets they are only willing to participate in multi-functional teams until budgets run out at which point they pull themselves from the team. It seems like you can not have one without the other.

Concurrent engineering.

Learning about the virtual organization (conceptual). Providing a good overview of world/US shipbuilding. Provide good overview of activity base costing. Presenter reinforced my position on the use/benefits of visualization and concurrent engineering.

Hearing that most US shipyards are in the same mindset as BIW, disappointed that BIW is not working with other shipbuilders on ABC. There has been a dramatic sense of teams here at BIW for the past 2 years it seems as though we have done a fairly good job. Reorganize if we want to become successful we must get away from a blame organization.

Team structure. Concurrent engineering. Statistical process control and understanding variation.

Understanding variations. Activity costing.

Statistics on our worldly competitors. We can change if we have the vision and determination. BIW needs to apply radical change, now! BIW needs to remove itself from the "blame game"! Let us (me) innovate!

Emerging organizational trends in the industry. How to implement them. How not to.

Reminder/refreshers on the tools available to successful or companies wanting to get better. Self-assessment was an eye opener to where we are not. The need for persistence and commitment to change.

How broad CE really is. A clearer understanding of ABC and its potential use for BIW. The level of explanation of team concepts and their dynamics.

State of US shipbuilding vs world. State of BIW shipbuilding vs the world. Opportunities available for company to take advantage.

Current state of worldwide shipbuilding industry.

Shipbuilding from a global perspective. Shipbuilding from a US perspective.

Costs of ships being built in foreign countries compared to what it costs us in US. We need to get a lot better. How many ships foreign countries put out in a year and the time frame. Enjoyed the segment on teams.

Implementing Advanced Technology

Scheduled Attendees: 23

Bath

Actual Attendees: 22

**The Most Helpful Things I Learned From The Course Are:**

The descriptions of CE and how they work in companies. Focus on how to make change and go forward (ABC/CE/TQM etc). Highlight differences between re-engineering and incremental change.

TQM and how it can apply to shipbuilding. Change management. You have to walk the talk.

CE evaluation. Activity based costing. Shipyard re-engineering overview and NSRP paper by M. Stellar, J. Breuton and G. Laughlin. CSF exercise.

I received a good understanding of TQM, ABC and CE. I liked being set up in groups right from the start and the team interaction.

TQM. CE. Teaming concepts. Concurrent engineering. Other shipyard exposure.

The large number of tools and philosophies available to improve shipbuilding. A view of "the big picture" which I did not have before this class. I was made aware of my coworkers understanding of the issues discussed.



Implementing Advanced Technology  
Bath

Scheduled Attendees: 23  
Actual Attendees: 22

**What I Liked Best About The Course Was:**

Good focus on concurrent engineering and teaming.

Learning about other change processes. The instructor knowledge of the industry.

The instructor's delivery. He maintained my interest even though much of the material had been received through courses such as teaming, CPI, project management, etc. previously.

General inspection of the shipbuilding industry.

Formal/informal format, good mix, good pace.

I was able to get up to date information on the implementation of advanced technology. It was in a class setting so it forced me to really take a look at the information. Where as if I was just given the book I probably would not look at it for some time.

Having reading and notes on what was covered.

An understanding of SPC and variation.

Seeing all the areas where we can improve with little cost impact!

TQM and CE.

Course manual. Reference to collaboration and consensus as keys.

The amount of material in this course related to what we are currently trying to accomplish here at BIW.

Tom Lamb. Very knowledgeable about all aspects of shipbuilding. He would be a major asset to any shipbuilding organization.

Course was very well presented, a little bit of everything discussed pertaining to shipbuilding. TQM.

The culture people-side focus of change.

The information on concurrent engineering.

ABC overview. Definitions used. CE group exercise.

The topics which were discussed.

History of various processors at other shipyards. TQM and CE and teaming.

The potential for improvement and a future in shipbuilding, with change.

Implementing Advanced Technology  
Bath

Scheduled Attendees: 23  
Actual Attendees: 22

**What I Disliked Most About The Course Was:**

Some of the exercises seemed rather silly and not worth the time (ex. "shield").

The flow between instructor and course notes that the audience has is poor.

Much of the material had been previously taught by similar courses.

Mixed up text book and poor graphic quality pictures and illustrations.

Basically no dislikes except that I missed some valuable time from the job during a peak time.

Lack of organization of book.

Length of concurrent engineering discussion.

Un-numbered pages on workbook - hard to follow along. Got "off track" with some little niches/comments.

More exercises to break up the lecture would have been welcome.

Too much lecture - not participative enough. Concepts linked to shipbuilding in a more specific pinpointed fashion to show it works.

The reference of using the "best" machines or individual.

Book was out of order.

The course had no stated objectives. As a result, although I believe a lot of good information was presented, it did not seem to be within the context of "Implementing Advanced Technology". I believe the course content did not match its name and therefore was presented to (largely) the wrong audience thereby not meeting their expectations.

That the right people did not attend. This should have been required for all vp's and directors, or do they think there was nothing to be learned?

Having to sit in a chair for 2 days and not race around the ship checking on people and check progress of jobs.

Implementing Advanced Technology  
Bath

Scheduled Attendees: 23  
Actual Attendees: 22

**What I Disliked Most About The Course Was:**

Too long on teams. We have had lots of team training wiht little practice.

How fast the information ws provided, too structured.

Too much detail for certain subjects; CE, etc. IPDE, IPPD and CE are not synonyms, there are subtle differences.

The instructors focus on where he was based on what time it was versus are the students getting it. Should be more student oriented and interactive.

Most of our time was listening, working on issues as a group would be useful. We had various backgrounds in the room to hear about failures or successes.

Lack of attendance by upper level (any level) management.

Implementing Advanced Technology  
Bath

Scheduled Attendees: 23  
Actual Attendees: 22

**Recommendations For Future Courses:**

Use more topic related exercises.

Make sure the audience has the right players in it, i.e.: vps and above.

Reference other courses BIW has offered in the past which this course may repeat as potential students may more intelligently elect whether or not to attend.

Involve senior management.

Develop electronic interactive presentation software with video clips sound etc.

N/A

1st day too slow shorten introduction and background especially TQM and take more time for day 2 topics.

Expand on understanding variation and ABC accounting.

Give some solutions. More teamwork activities. More class interaction - less lecture format! Shorter but more frequent breaks. Need breaks...info overload.

It would be helpful to have had opportunity to discuss some of these ideas with our upper management. Why have we or have we not yet implemented them?

Wrong attendees - more upper management. More interactive discussions (two-way) vs lecture. Gender sensitive - labor hours vs man hours. Earlier break, pm day 2 I died!!!

Attempts to have labor and managers in equal numbers.

Fix the book. Focus more on advanced technology. Shorter, more frequent breaks. More exercises to keep people involved.

Clearly outline course objectives and goals and make sure course content matches expectations.

Get the right people to attend.

Need to have people from upper management attend courses like this.

Get CEOs to make presentations at class and their view of the future and a Q&A period. VPs also.

Less structure half day longer to allow more discussion.

The course notes should be spell checked. Add page numbers. When studies are used that are not part of the course hand-out, info the students.

Reduce the volume of material being presented and give more exercises which hit the points home.

Allow the group to have a few more hands on type work items. This would get all involved more and will help each of us better understand where to apply this training.

Try and get employees from diversity of disciplines in attendance to maximize benefit of team exercises and discussions.

Implementing Advanced Technology  
Bath

Scheduled Attendees: 23

Actual Attendees: 22

**Any Other Comments?:**

Offer this training to “teamed” companies jointly.

I would like more discussion on how to implement tech. - re: management approach success factors.

Need to get upper mgt participation in these courses. We (BIW) must change (radically) our way of doing business.

The course should have a name more like “Implementing Advanced Management & Organizational Techniques”. The course was a wonderful summary of what US shipbuilders need to do to compete into the future.

Very informative, enjoyed. Very knowledgeable presenter (Tom).

Consider researching our HPWO concept.

More senior management would boost the perception of this course’s usefulness.

Need to include more specific implementation strategies and tools. The written material was poor; pages were missing, out of order or skipped. Not well organized. Visually inert.

I’ve been to my share of BIW sponsored classes but never have I experienced the quality of instruction that Mr. Lamb provides. He speaks from experience and from the heart. More importantly he does not read the curriculum verbatim and emphasizes the key points. He kept the course focused and entertaining.

Make the classes Navy sponsored and attempted to get key managers and the customers in the same room and talk CE etc.

Add more group exercises and reduce lecture. Eliminate some details IP subjectivity - behavior based elements.

It’s always very difficult to sit for two days. However group discussions and work shops can help!

Very informative. What about follow-up?

Implementing Advanced Technology

Scheduled Attendees: 23

Mobile

Actual Attendees: 19

**The Most Helpful Things I Learned From The Course Are:**

Review of technical development and implementation strategies. TQM & re-engineering. Understanding & Managing change.

Upper management must be committed no matter which route you take. Sharing information with all employees takes away a lot of fear. Bottoms up management seems to give all employees more job satisfaction and productivity goes up most often.

Team work. Talk to other departments to avoid problems. All working to a common goal.

Team concept and seamless interface between crafts. Reason why the CEO should leave problems to the crafts and stay in the support side of the fence. Lesson for success implementation in CE.

The idea of seamless teams to approach common problem areas. The status of shipbuilding in US world market and the enormous task ahead of US builders in the commercial market the concept of TQM as I can relate it to our production.

Terminology of production/management practices. Data study for cost of product and tools available. Some major differences between US and foreign shipbuilding practices.

How foreign shipyards use different methods to cost and evaluate performance. How other US shipyards are moving towards concurrent eng. and how this approach can benefit our shipyard. Methods to enhance performance through statistical evaluations.

ABC, must be used, commercial shipbuilding. CD, can improve performance. Useful cost figures, and news clips.

Concurrent engineering, the way it works. Ways to implement change. Article on team work, which is essential.

Activity based costing. Team concepts. Managing change.

That there are ideas from others who are in the same place as I am, i.e. compensated coefficients for turnover. Create refresher for the MBA (TQM). Stimulated brain, jump started it into a mode of creative thinking which was study design as a vault of negative stimuli.

Reaffirmed my general beliefs. Positive approach to what can happen.

Concurrent engineering. Re-engineering. IPPD.

TQM applied to shipbuilding. ABC accounting applied to shipbuilding.

Exercise on cost was enlightening. Information on shipbuilding industry was good. Concurrent information was excellent.

The need for US yards to be more competitive. Concurrent engineering fundamentals. Activity based costing.

Implementing Advanced Technology

Scheduled Attendees: 23

Mobile

Actual Attendees: 19

**The Most Helpful Things I Learned From The Course Are:**

Structure of international shipbuilding industry and relationship to US shipbuilding. Concurrent eng. relationships.

Relationships between modern approaches to change.

The practice of concurrent engineering. The philosophy of virtual organizations. The section on managing change.

Implementing Advanced Technology  
Mobile

Scheduled Attendees: 23  
Actual Attendees: 19

**What I Liked Best About The Course Was:**

Comments and points of interest from other attendees.

The wide range of topics we covered. Confirmed my beliefs on team building and how to get there. Must get employees to believe in themselves.

To help me understand how to open doors to prevent problems from becoming actions.

Picked up a lot of info, on team work, understanding what the other crafts and departments do for a living and what they are supposed to be doing.

The session on statistical process control.

Advantages of sharing information and techniques between departments in the company.

Detailed explanation of the team approach to improve performance/price/cost/and schedule.

The information on, and understanding C.E., new refreshing ideas for shipbuilding.

The presentation between foreign yards and US yards as to their productivity.

The discussion on statistical process control.

How it flowed together, great overview of the industry. How other yards are also plagued with similar problems.

Enlighten me of what is happening. Outside of our company.

IPPD and CGT studies.

Tom Lamb's experience/stories complementing viewpoints.

Tom Lamb's extensive background was very helpful in supplementing the material.

Activity based costing and CE.

Structure of international shipbuilding industry and relationship to US shipbuilding.

The broad overview of modern approaches to improvement of engineering oriented business.

The insight it provided when dealing with barriers and resistance to change and what has proven to be successful methods of reaching that goal.



Implementing Advanced Technology  
Mobile

Scheduled Attendees: 23  
Actual Attendees: 19

**What I Disliked Most About The Course Was:**

No detailed explanation of how some of the charts and graphs were developed or interpreted.

Nothing, I found it all very interesting.

I think material cost should be looked at as a question of sub-contract and/or pre-fab. assembly (man hours per gross ton).

Believe two days is too short of a time frame. Not enough info given to show how to get managements' ear to get some of this training in the company.

The section on concurrent engineering began well but became too involved and began to lose my interest.

That upper management in our company was not required to attend. Should have a break closer to lunch.

A little too much information to digest in two days.

No real dislike! Perhaps the hand-out could be improved. Too much covered in time allowed.

Room was cold first day.

In the beginning it was difficult to follow because we had to jump around in the book to follow the overhead slides.

Uncomfortable seating.

The booklet was out of order in places.

Need more real company success stories on Technology Transfer and TQM and ABC. It would be particularly effective if shipbuilding examples are available.

Tom's lack of knowledge of the companies that were represented at the course.

Lack of specific examples from shipbuilding to illustrate principles discussed.

The poor attendance from shipyards, especially in terms of people who really count.

The time allotted to presentation of the course. It could best be described as a "rush" course. Example: no formal break on day 2 from 8:00am until 12:00 noon.

Implementing Advanced Technology  
Mobile

Scheduled Attendees: 23  
Actual Attendees: 19

**Recommendations For Future Courses:**

Having taken courses in TQM it might help to go a little deeper. Maybe a Lou Holtz motivational tape. He is an inspiration!

More hands-on problems on team solving production problems.

Try to get more shipyard management in the class.

Run the same series again so I can coerce my dept. mgrs. to attend!

Course was very well planned and infomative, instructor was very well versed in subject and interesting.

Break out team idea and conucrent engineering.

Survey of international companies to determine what plans we need to develop. Do we in the US eng. give the yard too much?

Have similar course on ship repair.

Information between us and forgein "repair" work. Overhead ranges from US yards to foreign yards. More videos. Color slides would more clearly show/make statement.

Mesh with software programs as well as satisfying cost accounting aspects.

More courses on related shipbuilding engineering and processes.

Adapt the course for senior management and advertise as such.

Narrow the format or increase the time of the course.

This industry needs to see examples from other industries where co-operation between competitors have helped the industry as a whole. Bring in people from other industries to convince shipyards that industry cooperation on some essential items is good.

1) Course should be more descriptive at time of sign-up. 2) Allow sufficient time to cover the course 3) Preparation for course should hold higher priority.

Implementing Advanced Technology  
Mobile

Scheduled Attendees: 23

Actual Attendees: 19

**Any Other Comments?:**

Made me thirst for more knowledge and confirmed some of my management techniques.

Concurrent eng. implementation will be real hard at Alabama Shipyard, the big jump would be getting management on board.

Hold another short course covering essentially the same subjects but condensed to succinctly identify the need and benefits of: TQM, World Competitiveness, Concurrent Eng., Need for Change geared toward mgt that would not need to be as detailed as would be necessary for implementers. Your course was excellent however mgt. must be convinced of the need for these techniques. I feel that the mgt. of commercial yards would recognize this need more readily since litigation is not normally an effective method of securing a profitable project after the fact. Furthermore, commercial shipbuilding is market driven and profit driven through effective planning, production, etc., whereas military shipbuilding can be strategic, political, or a combination and profits are often obtained by attorneys.

Is there a way to level the playing field world-wide without the taxpayer? Presentation and format good.

Very informative meeting.

Photos of some of the shipyard techniques you described in your comparison of various US and foreign yards.

Target people in the organization that make the decisions.

Implementing Advanced Technology  
Mobile

Scheduled Attendees: 23

Actual Attendees: 19

**Any Other Comments?:**

Include technology innovation examples where yards have been successful and unsuccessful and why.

Tom is an excellent instructor.

Perhaps more techniques to encourage participants interaction - use name tags to encourage networking at breaks and in group work.

I was somewhat disappointed in the course because of my own misinterpretation of what it would contain. I perceived "implementing advanced technology" to be more of a mechanical approach as opposed to a philosophical one.

Implementing Advanced Technology

Scheduled Attendees: 20

NASSCO

Actual Attendees: 16

**The Most Helpful Things I Learned From The Course Are:**

Value of activity based costing. Value of variation when applied. We can improve and be successful.

Understanding variation/managing chaos. Managing change. World shipbuilding vs US shipbuilding.

TQM. SPC. CE.

An insight to the international shipyard market and comparison to US yards re: competitiveness. Virtual organizations and their role in the shipyard environment. Concurrent engineering and the broad spectrum which it involves.

Concurrent engineering. How to increase your chance of success. Teams.

We seem to be doing quite a lot of things wrong. We shouldn't change for changing sake, only to improve.

Rapid change is acceptable. Cross functional team concept. Concurrent engineering.

Understanding variation. Activity based costing. Concurrent engineering.

Overview of CE, ABC, re-engineering.

I enjoyed the overview of the shipping industry. Understanding CGT and how it can be applied to manpower. Renewed interest in SPC. I enjoyed this course.

Meaning of activity based costing. Meaning of gross tonnage.

How to handle change. How we as shipyard at NASSCO must change. Where the cost of shipbuilding is at ABC.

The need to break down barrier of rank and communication. The need to distribute responsibility at any level. The need to change philosophy and improve performance.

Concurrent engineering. Teams. TQM.

Concepts and uses of statistical analysis. Concepts and uses of concurrent engineering.

Team building approaches. Concurrent engineering. Re-engineering process.

Implementing Advanced Technology  
NASSCO

Scheduled Attendees: 20  
Actual Attendees: 16

**What I Liked Best About The Course Was:**

The opportunity for an insight into procedures which can be adopted which have previously been denied.

Understanding variation. Most useful for my job.

New ideas for looking at and tracking problems. Variance does not always mean a problem, but the process may need re-evaluating.

Presenters knowledge of subject matter/ability to cover extensive amount of material in such a short duration.

Opportunity to learn more about processes upper/senior management have to consider.

N/A

Insight and observations of how other shipyards approach business.

Being able to take a step back from my present job functions and getting a good overview of the industry and new business practices.

Nothing.

The open discussion about where we stand compared to other yards.

Honest appraisal of the plight of the shipbuilding industry.

Information on the world market and how NASSCO stands.

Very detailed and well organized.

Concurrent engineering.

Thought provoking ideas.

Informative and well laid out with consistent materials.

Implementing Advanced Technology  
NASSCO

Scheduled Attendees: 20  
Actual Attendees: 16

**What I Disliked Most About The Course Was:**

Lack of coordination between notes and lecture.

ABC. Disjointed, very high level and far too fast.

Did not get into specific areas of how to implement changes on a lower level of management. Needed more hands-on type projects related to shipbuilding.

Training center is a poor facility in which to conduct a seminar - numerous distractions created by external yard noise (poor sound dampening in class room); office traffic; vending machine usage.

That I am not in a position to implement 75% of the information this course contains.

N/A

N/A

Long spans of time sitting in one place, need more interactive exercises.

Nothing.

Revisiting TQM again.

Difficult to find anything in the course material. "Goals" for course are meaningless.

Lack of information in shipbuilding technologies.

Presentation was slow. It was hard to keep up the attention.

ABC

Too much material covered, too much lecture time too little hands on, cursory coverage of subjects.

Didn't feel it was about advanced technologies but rather advanced philosophies.

Implementing Advanced Technology  
NASSCO

Scheduled Attendees: 20

Actual Attendees: 16

**Recommendations For Future Courses:**

Ensure this course (complete) is taken and understood by senior management.

Far too much information for 2 days became disjointed at times, focus on benchmarking US shipbuilding vs best in world. Set action plan to meet market requirements.

If not done so already, the session on "activity based costing" should be held for cost estimating managers and senior management personnel seems difficult to apply at lower or different levels of the organization.

Working through the examples should flow smoothly. Tom appealed to the unfamiliar with a lot of the work.

Two ten minute breaks morning and afternoon.

Additional breaks, 2 hour sessions too long. Number pages in the course notes.

More exercises that require group participation.

Wrong people participating in course. Not in position to determine future course of action for company.

I would like to know more about the different technology in use by other yards (world-wide). Recommend providing formulas with the SPC section.

Have a NASSCO manager introduce the course, explain why we are here and why we were chosen.

How shipbuilding in the US can improve.

Increase listeners participation reduce the use of overhead projector.

Rather than a brief discourse on many subjects, reduce the number and go into greater detail.

N/A

Have top level management involved in courses.



Implementing Advanced Technology  
NASSCO

Scheduled Attendees: 20

Actual Attendees: 16

**Any Other Comments?:**

This course though very interesting is really for a management level higher than ours to those who really can make the necessary changes.

My VP monitors my process weekly. She uses manager tools training and expects data set in agreed ways. We have set KQC. Data is analyzed to show processes both inside and out agreed limits.

This course should be directed at upper management who makes the decision on which way the company will operate.

Feel that the information contained more applicable to upper management. Also expecting more on "technology" implementation.

Upper management should take this course I think this would benefit them more than it did me.

Follow up at some period of time in the future to determine the effectiveness of the course.

Thank you for taking time to present this information to us. The only way we will be able to change the way we do business is to have some management buy-in and require US to start to make these changes.

A lot of view graphs not included in course book. Give course to senior management.

Use process in a shipyard during the SPC section. It may stimulate ideas on how we can apply them. Examples from other yards would be great. Spent too much time on teams. This should be a separate course. I would like to know more about what other yards are doing to improve. Maybe then we would have a transfer of knowledge between US yards.

Reduce scope, improve depth. Most of course was review of other courses that many of us have had before.

I'm very glad I attended the course.

Establish the level of the players and teach subjects to that level, i.e. managers/management course on ABC.

Material is aimed at senior management but they are not participating.

Implementing Advanced Technology

Scheduled Attendees: 15

Newport News

Actual Attendees: 12

**The Most Helpful Things I Learned From The Course Are:**

Information on concurrent engineering. Information on reengineering.

Better understanding of our competition. NNS is doing a lot of the “right” things. Business process re-engineering fundamentals.

Team concepts. Re-engineering. Shipyard baselining.

Better understanding of the conditions effecting NNS re-entering the commercial market. The tools to change our way of viewing the process of producing a product. Information comparing US yards to NNS.

Design team work.

Information on the concept of re-engineering. Where the US stands in competitiveness on the world market.

The course reinforces recent NNS initiatives, i.e. process improvement, cross functional teams, and concurrent engineering.

Various facts concerning world shipbuilding vs US shipbuilding. Providing to US that we need to change the processes we use as well as the way we are managed if we are to become world class. The re-engineering sections.

Implementing Advanced Technology  
Newport News

Scheduled Attendees: 15  
Actual Attendees: 12

**What I Liked Best About The Course Was:**

Mr. Lamb's sharing of his experience in the world shipbuilding market.

Frank discussion by the instructor and of the participants.

Besides learning about team concepts and re-engineering which are closely associated with tasks I am working, it was most interesting to hear of efforts at other shipyards, i.e. the differences in how business and effort are conducted.

Instructor has experience in the shipbuilding industry and re-engineering US companies.

The information regarding how other shipyards are doing business.

The opportunity to share Mr. Lamb's vast shipbuilding experience.

Gleaning experiences from other shipyards, foreign and domestic.

Including articles from various sources on these topics. Showing how these theories and topics are applied specifically to shipbuilding. I've seen examples of some of them before, but they were applied to different industries.

Implementing Advanced Technology

Scheduled Attendees: 15

Newport News

Actual Attendees: 12

**What I Disliked Most About The Course Was:**

I was hoping to learn more about specific shipbuilding technologies being used around the world.

Nothing.

The actual formulas and practice of same on compensated gross tonnage were cumbersome and not necessary to spend much time on.

It was too rushed.

Too long between breaks, can see class attention span being taxed.

I had hoped to learn more about the advanced technologies being used, not just about the techniques for implementing them.

Too much emphasis on TQM and the gross tonage calculations for me.

I did not find the video particularly helpful.

Implementing Advanced Technology  
Newport News

Scheduled Attendees: 15  
Actual Attendees: 12

**Recommendations For Future Courses:**

Seminars from those who have gone through change (significant) like we are about to do.

Expand on the differences of business and labor efforts to other yards. I would like to hear more of how yards approach the same ultimate objective (ship delivery), i.e. what are their mechanisms and processes.

Expand to 3 days to more fully explore the subjects presented.

That they be more pertinent to the level of management of those attending the course.

More emphasis on steps to actually implement advanced technology strategy development.

Provide detailed reference material or identify reference texts (i.e. a list of texts) on some of the areas discussed such as SPC. The purpose being that students may want to apply what was covered and need technical details.

Implementing Advanced Technology  
Todd

Scheduled Attendees: 24  
Actual Attendees: 13

**Any Other Comments?:**

I liked the location, also.

The course was directly in line with what management is asking of us in their leadership conference meetings.

Excellent class for management. Good to meet you.

Proving to us that US shipyards are not as productive as other countries are, was good. I found the discussion on world shipbuilding demand, cost, productivity, etc. (day 1) very interesting.

Implementing Advanced Technology

Scheduled Attendees: 24

Todd

Actual Attendees: 13

**The Most Helpful Things I Learned From The Course Are:**

The magnitude of the disparities between US and international shipyards. Production techniques employed by international shipyards.

The enormous productivity gap between US and Asian yards. The CGT as a measure of competitiveness in shipbuilding. The need for radical re-engineering of US shipyards. The value of ABC.

State of world-wide shipbuilding industry.

How to recognize and utilize the people factor. Charts vs variance analysis. Explanation of concurrent engineering.

Teamwork improves even a good system. The evolution of upper managers and middle managers to TQM team with the workers. Reasons for downsizing - vertical to horizontal concerns.

Reacquainted myself with TQM & SAC principles.

Recognize the adversary/relationship and start to come up with ways to eliminate. Cost compares to activities. Cross engineering (team work).

CE. TQM. Business plan.

Accuracy control. On time delivery. Bench marking.

Shipbuilding policy. Concurrent engineering. Ship outfitting.

TQM (getting people involved) (trust) (planning) (quality). Concurrent engineering (as a team) IPT. Understanding variations (Grafts).

Learning about what other shipyards are doing. Managing change. Video on just in time manufacturing.

The intro to CE. Team concept. The concepts of advanced manufacturing and zone outfitting.

Implementing Advanced Technology  
Todd

Scheduled Attendees: 24  
Actual Attendees: 13

**What I Liked Best About The Course Was:**

Videos & examples of significant overseas shipyards.

The all around shipbuilding knowledge of the speaker.

The “state of the industry” and management topics.

Enjoyed background of shipbuilding/process improvements and video of other shipyards.

A team approach that applies to our occupations (vessels/shipyards). Proved again figures lie, liars figure.

Gained a better understanding of shipbuilding.

Introduction to new established ideas, processes.

Good notes for future reference/handouts.

The overall history of shipbuilding and where we are in reference to the world market.

Shipyard dimensional control, “block construction”.

Lots of facts and information about shipbuilding as team work, goals, common sense.

Stories of development in other shipyards. Slides of other shipyards.

The concept of CE.



Implementing Advanced Technology

Scheduled Attendees: 24

Todd

Actual Attendees: 13

**What I Disliked Most About The Course Was:**

Given the 3 day condensed format, felt too much time was spent in the 3rd day of the mechanics of concurrent engineering.

The "old" video and "bad" slides. Floor section are the same everywhere. Too many "lists" for basic ideas.

The personnel from Todd were not the least interested and provided little input to the discussions, etc.

N/A

Could have been longer.

Too much material in too little time.

The amount of material and ideas to absorb in a short time frame.

Large topics, short time allowed.

N/A

The course was very good overall, but we all got tired of hearing how other countries are better or cheaper than ourselves; but we need this info in order to change.

N/A

Handout material (overheads) in most cases were dated. Several reproductions were illegible.

Fast paced.

Implementing Advanced Technology  
Todd

Scheduled Attendees: 24

Actual Attendees: 13

**Recommendations For Future Courses:**

N/A

Better organization of time resources.

Try to get shipyard management involved and the right people to the course.

Slides and video of other yards build strategy interesting.

A TQM team of upper managers with middle managers and the workers.

Explain technical aspects better.

Would like more information on the team work concept.

Allow more time for course or limit context.

That the course be directed toward the local shipbuilders problems and best solutions to local problems.

I feel we here at Todd Seattle need more training and input (at a lower management level) for the shipbuilding policy, I am not sure we all know or agree what this policy really is or means to the company.

Keep talking about training, teamwork, management and employees trust.

Update overheads and handout material. More frequent breaks, facilitate discussion - develop ways of pulling information and cross discussion.

N/A

Implementing Advanced Technology  
Todd

Scheduled Attendees: 24

Actual Attendees: 13

**Any Other Comments?:**

This course has provided me with new information to use as a tool to approach existing problems in my workplace and to better understand the changes currently underway.

Very good instructor and materials. Instructor has been there and can relate to needs.

Printed material needs better overall organization, page numbering.

A lot of material in 3 days, would liked to have had more time.

I feel this information is most important for us if we want to be US competitive shipbuilders. Thank you.

I hope Todd management looks at CE closely and decides it to be beneficial to Todd shipyard. I think it would be.

Modern Ship Production & Repair

Scheduled Attendees: 25

Bath

Actual Attendees: 24

**The Most Helpful Things I Learned From The Course Are:**

I was very impressed with the information presented. Having come from afar (down south, VA) I have long contended that there is a big world out there beyond the microcosm here at BIW. Even I did not have any idea as to how big the world was. In defence of BIW, I do see many of the topics of this course in use here, especially in new technology. We have a long way to go.

I am a front line mechanic and have taken the whole BIW shipbuilding process course. This course was clearer and had a more straight forward presentation. There are a lot of decision makers in this company who should of been here.

Expectation = Acquire a better understanding on how to achieve and become a world class ship builder at world class prices in preparation for the 21st century. Results: A) Verified accuracy control as a weak link at BIW must improve to maintain our edge with future bids. Avondale is currently there. B) Realized that my training is possibly without major capital expenditure, we do have areas that we can pursue in achieving lower cost or better returns. i.e., unplanned labor in reference to rework of paint, design issues can also be looked at and finally the most important is our resources. We must make them understand on where we fit in the overall world picture, HPWD must be introduced to the deck plates.

Not only did I gain a level of knowledge in ship production that will better equip me to be more supportive of construction in my engineering role, but I now have a much better understanding of practices in place at other yards and where BIW needs to go to be competitive for the future.

This course did an excellent job of presenting concepts of modern ship construction. It exceeded my expectations in all counts. The concept of statistical control were especially interesting. Something which would be interesting to include would be a description of the process of change (organizational and technical) the Japanese from the 1940s to 1970s in order to provide a "perspective" path to follow.

Modern Ship Production & Repair  
Bath

Scheduled Attendees: 25

Actual Attendees: 24

**The Most Helpful Things I Learned From The Course Are:**

The course did fulfill my expectations and did provide some new insights. The final film struck home. We produce 15 panels a month that are half the size of what the Danes were doing (15 panels a day). It was good to see some of the innovations being used world wide. Maybe one or two will find their way here. Thank you Howard. I have appreciated this course.

I found that knowing the history of shipbuilding helped to give me a better understanding of where we are going. We also need to take the policy that we have in place and make it work. There is a lot of room for improvement here at BIW. I hope we move in that direction.

There were parts of this course that were enlightening and others that were areas of known knowledge. As well as some that were not totally factual. Overall this course was interesting and reinforcing to the fact that if we as an industry are 1st going to survive in this country and 2nd in this world or "globally" we need to go through a very dramatic change.

I realized that this company sometimes does things that are totally contrary to what the rest of the ship building industry has found to not work. I must admit that we seem to be currently headed in the right direction. This course provided a good deal of knowledge not only for commercial work but info that applies directly to BIW's current process. Thank you to Mr. Bunch for sharing his wealth of knowledge!!

This course provided another view of the advanced technology concepts that BIW has tried to evolve over the last 15 years. It was a more global view than what I am used to -- my past experience tends to be focused on specific issues such as PWBS, such as group technology, etc. I also feel that while our typical approach to overhauls is job oriented, that potential exists for it to be zone oriented.

Modern Ship Production & Repair

Scheduled Attendees: 25

Bath

Actual Attendees: 24

**The Most Helpful Things I Learned From The Course Are:**

Even though I have been exposed to some of the topics in this course I still benefited from your vast experience in naval architecture and ship production. I especially took note of the trends and “role measure” you shared with us. Good luck with your new adventures.

I learned about important facts that allow me to better understand how modern shipbuilding looks like and where to go in the future. Need this kind of training for a wider audience.

This course confirmed for me that many of these concepts are consistent with concepts we witnessed both in Finland and Japan during our technology transfer. It appears to me that we have brought back the concepts that will take us into the 21st century as a world class shipbuilder. If implemented in the correct manner. Too often changes in our company are altered from the original idea and the end result is inefficient. This course was very informational and contains concepts that are the “right things” to do. They should be communicated and exercised throughout our company to all disciplines. Thank you!

The accuracy control portion was presented very well. I was hoping to gain a better understanding into a “dual use” role. The program was a good view on shipbuilding “production” processes. I wish the US government would have the same sense of importance on shipbuilding. This industry is vital to help the continuing of manufacturing in this country.

This short course did help me learn new concepts in unit outfitting, planning, and schedules, would like to have seen more info on the painting and corrosion control processes in modern Navy shipyards.

Modern Ship Production & Repair

Scheduled Attendees: 25

Bath

Actual Attendees: 24

**The Most Helpful Things I Learned From The Course Are:**

Course has a lot of information for a person that has just started to go in to shipbuilding.

Overall content very good. Lots of information. Class time was too long...suggest 5 consecutive half days! Need more info on Naval shipbuilding. Videos very helpful. Instructor knowledge was excellent. Some of this textbook material was unreadable. Textbook in general laid out very well. Enjoyed "hands-on" discussion project...need more group exercises, possibly on opening session. Recommend to upper management, condensed version. SPC info was overly technical for generic group. Made me stop and think "what can I do with our existing processes to make a difference?" We seem to have huge hurdles to overcome with our facilities alone. I do believe we need a cultural attitude change to educate and motivate our BIW employees before we can successfully implement any process change. Is our company committed to getting more efficient? At what cost? What level of commitment? Most people will follow any leader who is sold out and going in same direction.

My expectations for basic understanding on the following areas were totally met and exceeded, 1) JIT delivery system 2) effect of ECP's 3) work order. I am approaching this with very little knowledge of ship production and truly appreciate the overview provided. It will serve as a framework for my future learning.

Very good overview of shipbuilding processes; not enough time to cover some of the material.

I now have a better understanding of past of current shipbuilding process. Better understanding of possible automation and its benefits. Now recognize that other steel is the major divider here at BIW and that we really need focus on some attractions to this area. Plasma cutter has perked an interest to me and I will now take some time to observe and learn more about BIW's version. Better understanding of how BIW is affected by union/management relationship and process improvements. Recognize the importance for BIW to modernize its facility. I would like to thank you Howard Bunch for an excellent presentation and for your openness of knowledgeable statements. I am very glad to have an opportunity to be part of this training program. I believe I will become a better and more informed employee here at BIW. I now have a different (better) understanding and realization of shipbuilding and what we here at BIW need to look for in the future.

Modern Ship Production & Repair

Scheduled Attendees: 25

Bath

Actual Attendees: 24

**The Most Helpful Things I Learned From The Course Are:**

I have walked away with a new understanding of how the production of a ship should occur as well as what is the "state of the art" in shipbuilding. I feel that it has fully meet my expectations. One note: Having the figures away from the notes made it difficult to follow - I need to "bounce" back and forth. Print quality was also an issue.

It was interesting to see another aspect of shipbuilding other than BIWs. The course was extremely well planned out and presentation was excellent. The fact I have been in production for 13 years made most of the material very basic to me. Also the fact that most of info was 10-12 years old and we (BIW) have advanced beyond most of it. The last day (3) was the most informative for me.

I obtained 'in theory' how modern shipyards are growing and improving in production and planning. There are some lessons here that BIW can use. I felt that the majority of this course was too basic for this class. Mr. Bunch is an excellent presenter. One thing has become apparent to me is that the dates being presented is approximatly 10 years old and in some cases we have yet to implement the processes.

Thank you so very much...for what was for me an excellent three days!! I came into this course wanting to "take it all in," to learn as much as I could about the basics of shipbuilding, to walk away just a little more "production literate". I can honestly say this course and your presentation hit the mark in all catagories! I gained some insight into so many different areas: shipbuilding history and changes, material flow, cutting systems, welding systems, surface preparation and coating, CIM, JIT, TQC, hull block construction, group technology, zone outfitting, coding, classification, planning and scheduling standards, dimensional control, accuracy control, ...finally, experience curves. And you know what...I did take it all in...I go back to work with not only increased knowledge, but also with an increased sense of excitement, curiosity and inspiration as I continue in my career here at BIW. We have great times ahead...I am so sure...and I thank you for the expertise and experience you have shared with me over the past 3 days.



Modern Ship Production & Repair  
Bath

Scheduled Attendees: 25

Actual Attendees: 24

**Any Other Comments?:**

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1,2&6=very true, 3-5=true, overall=very true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1-4=very true, 5-8=true and overall=very true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1,3&5=very true, 2,4&6=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1-4=very true, 5&6=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1=neutral, 2,4&6=true, 3&5=very true, and overall=very true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1&2=true, 3-6=very good, and overall=very good.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1,4&5=neutral, 2,3,&4=true, and overall=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1=neutral/not true, 2-4&6-8=true, 5=very true, and overall=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1=neutral, 2,5&6=true, 3&4=very true, and overall=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1-4=true, 5&6=very true, and overall=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 2&4=true, 1&3-5=very true, and overall=very true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1-4=very true, 5-8=true, and overall=true/very true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 4&8=true, 2-7=very true, and overall=very true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1-6=true and overall=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1,2,4&6-8=true, 3&5=neutral, and overall=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1,2,&5-7=true, 3,4&8=neutral and overall=true.

Modern Ship Production & Repair  
Bath

Scheduled Attendees: 25

Actual Attendees: 24

**Any Other Comments?:**

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1&2=very true, 3&4=true, 5&6=neutral and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,2&5=very true, 3,4&6=true and overall=true/very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1&5-8=true, 2&3=very true and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-4=very true, 5&6=true and overall=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-7=true, 8=neutral and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-6=true, 7&8=very true and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1=not true, 2,3,5&6=neutral, 4=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-4=very true, 5=true, 6=neutral and overall=very true.

Modern Ship Production & Repair

Scheduled Attendees: 24

Mobile

Actual Attendees: 16

**The Most Helpful Things I Learned From The Course Are:**

Very interesting on hull block construction, painting whole course was great!

The information was very valuable and informative. Suggest certain info be used in "real life" situations.

Picked up a lot more information about monitoring process control, material control and just in time inventory. More than anything else how important planning, pre-planning, scheduling and staying within the limits of the scheduled plan. How to monitor the project to see when you are out of control and how to get back in control. Our yard is probably at about the 20% mark but we are coming on strong at least this course makes me think so.

I became more aware that the US needs to update their processes and to be more aware of new processes to become more competitive in the world market. The tools and charts in the book will give me good and new methods of material control and in other areas of my planning.

Very informative course, well presented a lot of information for a three day course. I wish the class could have been held in a more suitable environment. I would like to attend more like this. Thanks.

1) The course highlighted the need for engineering to have lead time on any job, engineering and planning must work in concert to be effective. 2) The course cemented the need to undertake all processes described to be effective. Partial implementation will not work effectively. 3) The course was enlightening.

What I obtained from the course was an understanding of modern shipbuilding but more important it opened my mind to thinking differently and applying technical expertise to solving our problems. Ingalls should be a world class shipbuilder we have the means. Have we the will time will tell.

The extent of the materials involved was much greater then anticipated. Confirmed and enlarged my present knowledge.

I judge the success of this course by the reaction of several of my co-workers, which was all positive. The material was very thought stimulating and gives us a better idea of where we should head.

Planning and the reasons pointed out in the lessons for planning will help in shaping a vision for upper management.

I obtained confirmation that in many cases applying a rational analysis to existing processes can lead to improvement. The temptation under the heat of production is to avoid taking risks and therefore avoiding some areas where improvement can be made.

Modern Ship Production & Repair

Scheduled Attendees: 24

Mobile

Actual Attendees: 16

**The Most Helpful Things I Learned From The Course Are:**

The course has been very informative in the way of introducing and explaining modern ship production techniques and processes. The instructor was very knowledgeable, and presented the subject matter in a way that it could be understood.

One major area covered by the course that can be used in the contract specification development area is in standardization. If contract specs are written with standardization in mind, true savings can be realized.

This course confirmed some ideas I already had and certainly opened my mind up to further exploration of more modern techniques.

The course provided a good overview of modern ship production methods. I have much better understanding of group technology and continuous process improvement methods. It has prepared me to dig deeper into these subjects in the future. Thanks.

Modern Ship Production & Repair  
Mobile

Scheduled Attendees: 24

Actual Attendees: 16

**Any Other Comments?:**

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1&4=neutral, 2&3=true, 5&6=very true and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-5=true, 6=neutral.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,2&4=very true, 3,5&6=true and overall=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,4&8=very true, 2,3&5-7=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-6=true and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,2,5&6=true, 3&4=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,3&4=true, 2,5,&6=neutral and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,3,4&6-8=true, 2&5=very true and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-6=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-4&6=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: All the material was good. However, readability should be improved.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1=true, 2-6=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1&3=true, 2&4-6=very true and overall=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1&2=true, 3-6=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,4&6=neutral, 2&3=true, 5&8=very true, 7=not true and overall=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session:

Modern Ship Production & Repair

Scheduled Attendees: 24

NASSCO

Actual Attendees: 21

**The Most Helpful Things I Learned From The Course Are:**

It surprisingly met all expectations and then some. I would recommend this course for others at NASSCO.

My expectations were met and I believe this course helps confirm many of the programs we are moving toward. I hope this course is made available to many more NASSCO employees.

The course met all of my objectives. It provided a very good summary of what can be done in a shipyard.

Overall all information was very helpful. I will require more time to study and re-read most of the course. I would like to have additional information if NASSCO is planning any additional courses.

I found this course interesting in a way that showed how other shipyards are utilizing the automated systems available to increase productivity. This was the first time that I was exposed to the ship production, and I hope it will help me to understand what my customers' needs are.

I obtained a good understanding of where we need to go in order to be world-class. My fear is that I will only become frustrated by this knowledge if NASSCO management doesn't get the same message and pursue these changes. I will however, try to intergrate this knowledge into my work. One comment on course content, I thought that the morning session on day 2 should have spent more time on the advanced manufacturing techniques and less time on the comparison of US yards to other yards. I didn't get the point of CIM, TQC, and JIT figures.

This course intorduced me to many ideas and concepts that we at NASSCO need to implement and improve. The scope of the material actually raises more questions as to how than answers, but that is good since we are the only ones who can help ourselves. I think everybody who attended this course benefited greatly, however, there are other people at NASSCO who need to see this information before it can be implemented.

This course provides an excellent overview of the entire ship production concept. It becomes obvious in the discussions that the need for complete education and understanding of these concepts is necessary in both production and engineering. The interim product is just as important as the entire ship and this is sometimes (if not always) overlooked. The only factor resulting in a rationing of true vs a rating of very true is that the content was not provided to specific groups (ie outfitting, steel, facilites). This would be an excellent area for further education within the yard.

Modern Ship Production & Repair  
NASSCO

Scheduled Attendees: 24

Actual Attendees: 21

**The Most Helpful Things I Learned From The Course Are:**

I had had four limited expectations from this course. They were all met. 1) summary understanding of the important aspects and issues in each of the related topics/issues, 2) understanding of how each topic interacts (is effected by) with the other topics, 3) definition of what is considered "world class" execution of each topic, and 4) insight into how one determines what is required to achieve "world class" in each area. The global perspective of Prof. Bunch greatly enhanced the presentation of the material.

The first two days were disappointing. I was looking for thought provoking concepts. The last day was very good. The example of Avondale's pipe shop improvements is the type of implementation blue print I was expecting to see and hear. Also standardization of design and production was good, accuracy control was good. If the production was good, accuracy control was good. If the entire 3 days went into depth of the last days ideas it would be excellent.

I found this course to be very enlightening. I was already familiar with many of the concepts discussed - group technology, activity-based costing, etc. - but I had never heard them discussed in the context of shipbuilding. Although I know they would be helpful, I now know which methods are critical to competing with world-class shipyards, what the pitfalls in implementing them are, how successful they have been elsewhere, and exactly how they fit into a comprehensive effort towards world-class manufacturing.

Yes, very helpful in reinforcing my perception of some specific processes the areas were accounting methods, efficiency measurement and in general current world shipyard assessment/comparisons. The accuracy control lecture will help as the definitions will clarify direction we need to take in outfitting accuracy.

The course was presented in a very good manner. Very interesting and informative. I believe some examples of subject matter should have been presented in a comparative way as to how NASSCO does our methods! Some information was out of date.

Some of the expectations were teased with tid-bits of relevant data. I expected more "meat on the bones" for a training class directed at people who are employed at a shipyard please see attached page. I am interested in the proven and leading technology manufacturing processes for each stage of construction. I am looking for which processes are compatible and which are not. Finally I am looking for ways to gauge process capability and capacity so that the right tools are available at the right time (JIT facilities) NASSCO needs to understand "limited resource" planning and how to maximize utilization of the existing manufacturing process assets.

This course came up to my expectations. No. 1 being directly involved with production, I found the course content very informative and interesting. It gave me a better understanding of ship production technology, which I feel will be of help in my everyday work.

Although "broadbrush," this was a very useful and informative course. I learned a lot thank you. Some suggestions: 1) Suggest you foster some interaction, through questions to audience - hearing what NASSCO does is also very useful. 2) Sorry, but some of the visual aids are awful many can't be read, 3) the book; and the imagery cannot be read on the overhead. Otherwise excellent. Good job.

Modern Ship Production & Repair

Scheduled Attendees: 24

NASSCO

Actual Attendees: 21

**The Most Helpful Things I Learned From The Course Are:**

This course far exceeds my expectations. Although time was short and the subject matter large, it was excellently presented and very informative. I am sure that I will use this material in on-going process improvement teams in our departments.

At first I was interested in information about other depts namely planning and outfitting because I'm in the steel dept, have been over 20 years. So I think I know it all. But after sessions 3 and 4 I can see how much more improvement can be made in my own area. WE need more planning and hull system attendance at this course to aid me in convincing people to change their work to help NASSCO.

There was some good information in this course. It was however few and far between amongst material I'm familiar with. The best parts for me were comparisons of shipbuilding to other industries. It is evident through that Prof. Bunch does not have personal experience of some of the techniques that he advocates such as JIT. I appreciate his advocacy of these techniques and agree that they need to be part of a world class shipyard.

The class is exactly what I expected it to be, very basic in some sections and interesting when applied to others. Since I'm in the facilities dept. the first day was very basic, material flow, cutting systems, etc. The video of other shipyards was very interesting. The second day was helpful in terms of interaction to outfitting for production. Third day material is what I wanted to see and it turned out to be what I expected. Overall course content especially the video of other shipyards were great.

I never had any formal education of ship building so naturally this course was informative. I learned the basic concepts, terminology, and definitions of ship production. I also reaffirmed my confidence that we are moving along in the right direction toward modern ship production practices. My expectations of the course were basically to learn more about my tasks from an ideological stand point. I would conclude that my support efforts are in line with competitive goals.



Modern Ship Production & Repair  
NASSCO

Scheduled Attendees: 24

Actual Attendees: 21

**Any Other Comments?:**

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1=true, 2 through 7=very true, overall=very true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1=true, 2=neutral, 3 & 4=true, 5 & 6=very true, 6 & 7=true, and overall=neutral/true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1=true, 2=very true, 3-5=true, 6=neutral, and overall=very true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1=very true, 2=not true, 3,4&6=true, 5,7&8=neutral, overall=neutral/true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1,3,5&6=true, 2&4=neutral.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1&2=neutral, 1-8=true and overall=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1,3,4&6=very true, 2&5=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1=neutral, 2&4-6=true, 3=very true, and overall=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1&2=neutral, 3-5=true, 6-8=very true, overall=true/very true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1-4=not true, 5&6=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1,3&6=very true, 2,4&5=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1,2&6=very true, 3&4=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1,3,4&6-8=true, 2&5=very true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1&2=not true, 3&5=true, 4&6=neutral.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1-8=true and overall=true.

"Material was helpful in developing a better understanding of concepts of ship production." This statement was for session: 1&2=neutral, 3-6=very true.

Modern Ship Production & Repair  
NASSCO

Scheduled Attendees: 24

Actual Attendees: 21

**Any Other Comments?:**

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,2&5=true, 3&6=very true, 4=neutral.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,2,5&6=true, 3&4=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1=not true, 2,3&5=neutral, 4&6=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,4,&6=true, 2-4=neutral.

Modern Ship Production & Repair

Scheduled Attendees: 19

Newport News

Actual Attendees: 16

**The Most Helpful Things I Learned From The Course Are:**

More hands on experiences would be helpful. Helpful to see all that can be done to improve the outfitting process. Push vs pull video was effective.

I have been aware of some of this material over the years, but it is really useful to have this course draw it all together. This information needs to be widely disseminated and then put into practice.

This was a valuable course from the entire production process. I learned a great deal about the process as well as identifying areas for improvement. The important concept is total improvement in the entire process since everything is connected. There are some things that would be more difficult than others considering cultural and economic (business) differences.

As a result of this course, I better understand why Hopeman Brothers is making changes in its factories and shipyard production practices. Maybe even more importantly, working at Avondale 905 of the time I better understand why they are making changes and now realize the challenges of working with group and unit construction.

The use of new technology in shipbuilding and the need to produce a product that is the same as the one before and the one after the need to go to a modular outfitting process.

I received a pretty good understanding of the overall concept of the shipbuilding process from advanced planning to completion. Also a pretty good comparison of World class performance and most US shipyards was presented. Although we at NNS employ many world class concepts, we have a good way to go, especially in the area of pre-outfitting and zone technology. I realize that there is a need for a change in mentality, especially with upper management and design engineering to get these concepts rolling. This was a most interesting course taught by an outstanding knowledgeable man (Prof. Howard Bunch).

I learned that the complexity between contract being awarded to launch is much more complicated than I imagined. In order for us to obtain world class status we need to look at each phase and make it flow smoothly step by step to a finished product. The information received should be presented to managers and design persons. These people are the ones who can make most changes take place. Working entirely waterfront am not afforded the position of making changes that should be made. It was a very interesting course taught by a very interesting instructor (Howard Bunch).

To include a more standard type of installation process on board ship would probably benefit the labor hours.

My expectations were met Thanks very much. Glad we were able to get you for your last assignment for U of M.

Very valuable information exchange covering; 1) what is really going on in the yard 2) what we were capable of 15 years ago in commercial work and 3) techniques/processes and in other domestic/forgien shipyards particularly in outfitting, piping, and hull block construction.

Modern Ship Production & Repair

Scheduled Attendees: 19

Newport News

Actual Attendees: 16

**The Most Helpful Things I Learned From The Course Are:**

I got the information I wanted for future apprentice courses. Dr. Bunch is always interesting to listen to and talk with. I would still like copies of all videos for use in my class.

The expectations of world class will mean a major change in short term management objectives. Money must be spent on planning tools and areas not previously identified as requiring changes.

1) The importance of standards production systems and accuracy control. 2) An awakening to the new ways of world class shipbuilding 3) The course does not deal directly with our type of work, but what I have picked-up from the course will be very helpful and I can translate it into my every day job.

Overall a very well presented course. I wish we had more time. Not only was the training information interesting, but the external discussions were also very informative. This was an eye opening course. I would like to see more commercial oriented NNS personnel get the opportunity to experience this training.

Modern Ship Production & Repair  
Newport News

Scheduled Attendees: 19

Actual Attendees: 16

**Any Other Comments?:**

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 3=neutral, 2,5&6=true, 3&4=very true and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,2,4&6=very true, 3&5=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1&4=very true, 2,4&6=true, 5=neutral and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,3&4=very true, 2&4=true, 6=neutral and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production. This statement was for session: 1-6=true, 7&8=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1&6=true, 2-5=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-6=true and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,2&4-6=true, 3=very true.

“Material was helpful in developing a better understanding of concepts of ship production. This statement was for session: 1,2&5=true, 6=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1&3-6=very true, 2=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-3&5-6=true, 4=very true and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1-4=true, 5&6=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,2&4-6=true, 3=very true and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1=neutral, 2,3,5&6=true, 4=very true and overall=true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1=neutral, 2&3=true, 4-6=very true.

“Material was helpful in developing a better understanding of concepts of ship production.” This statement was for session: 1,2,5&6=neutral, 3&4=true.

Modern Ship Production

Scheduled Attendees: 28

Washington, DC

Actual Attendees: 22

**The Most Helpful Things I Learned From The Course Are:**

Insight into manufacturing processes of shipbuilding difference between various shipyards.

Ship production issues include block and zone concepts, advanced outfitting, etc and the cost benefits of these concepts. Focus on what works in each shipyard. Not all ideas are "right" for everyone. Emphasis of processes and process control to improve production.

Block breaks (hull block construction). Zone outfitting. Advanced outfitting, CPM.

Insight into other shipyards facilities that are competitive. Shipyards are competing by simply working smarter. US is so far behind world market leaders in commercial shipbuilding radical change is needed not just continuous improvement.

Great improvements can be made just by changing approach and processes. Advantages of advanced outfitting. Better understanding of block breakdown and zone approach.

Gave me a different perspective on how the yards work. I did not know where future building was headed and now I know. I learned a little bit about the finer points of construction processes that I may be able to take with me.

Overview of current US, European and Asian yards. Overview of shipbuilding process. Overview of factor for worldwide competitive yard.

The types of production processes used by other shipyards. The difference between the learning and experience curves. The US shipyards have a long way to go to become competitive in world wide commercial shipbuilding.

Detail discussion of PERI/CPM. Better understanding of unit outfitting. Better understanding of accuracy control.

Overview of shipbuilding from 1910 to present. The importance of advance outfitting towards cost savings. The differences between foreign and US shipyards. The importance of planning and scheduling.

Construction methods and grand block, block, assembly, subassembly, etc. The explanation and differences between dimension and accuracy control. The difference between experience and learning curve.

Computers, especially in design and planning are critical tools in modern ship design. There is no one simple solution to the ship production success, must look at whole picture. Stable processes are key to being competitive.

About differences in shipyards, different processes. The different lines of thinking learning vs experience.

Overview of shipyard layouts and equipment. Impact of advanced outfitting on productivity. Specific construction problems/solutions, e.g. weld distortion.

The block concept. Zone outfitting concept.

Open discussions very good. I learned a lot about current stuff going on through this. Slides were very interesting and since I've never seen a shipyard before seeing actual photographs was helpful. Discussions about the way things have changed was helpful for me.

Modern Ship Production  
Washington, DC

Scheduled Attendees: 28  
Actual Attendees: 22

**What I Liked Best About The Course Was:**

Good instructor, I always like to listen and learn through Tom's stories about his work experience.

Sharing real life experiences and stories. The technology investment debate.

Advanced outfitting and block breaks.

Photographs of facilities. Good supporting documentation/papers.

Very good overview of world-wide modern ship production.

The movies, slides, and "sea stories" about work in the yards.

The discussions about shipyard experiences. The 3 videos on the first day.

The slides showing production processes and equipment used by other shipyards.

Examples from industry.

Video and open discussion.

All the topics in the 2nd day except CPM/PERT and topics of grand blocks and blocks.

You added a lot of your experience into the instruction and discussions.

Use of four different mediums, video, slide, over-head, and board kept me interested.

Excellent videos/photos on shipyard layout/equipment.

The world wide shipyard information provided.

Everything was very good. Although, I came to this course with no knowledge of ships so everything was new and interesting for me.

Modern Ship Production  
Washington, DC

Scheduled Attendees: 28  
Actual Attendees: 2

**What I Disliked Most About The Course Was:**

Not enough input from the class the first day - although Tom tried.

N/A

None (I liked them all).

Presentation material not well prepared/disordered. Exercise on block/zones seemed disjointed.

Slight disorganization of the course material.

The group exercises.

N/A

I wonder if the exercises are necessary. We spend a lot of time working on the exercise but little time discussing the results.

None.

Too many slides of same thing.

First part of the video presentation.

Slightly disorganized. You did not really walk us through the steps from requirements to delivery. It seemed a bit disjointed.

Breaks too long.

Zone technology exercise probably required a 5 minute explanation versus a full blown experience.

Long instruction periods.

If I had to choose something it would be the exercises. Maybe if it were shorter (the zone one) it'd be better.



Modern Ship Production  
Washington, DC

Scheduled Attendees: 28

Actual Attendees: 22

**Recommendations For Future Courses:**

More exercises - the last one was good.

Ship design course or courses specifically addressing ship components i.e. machinery systems, structure, etc.

I recommend this course to everybody.

Spend more time to introduce yourself and detail your experience/work history, because you are constantly drawing on this knowledge/experience throughout the workshop.

Only half hour for lunch, conclude day half hour early.

Develop the group exercises so they are a little more clear or drop them. Instead of 30 minute breaks go for an hour and a half and have 2 10-15 minute breaks.

Show the slide show in a more logical manner. Walking someone through a yard, down process lanes, sequentially, etc.

Please update and reduce the quantity of slides. Slides from 18 years ago are nice for comparison but I want to see the newest equipment and techniques used by the Europeans and Asians.

A course more oriented toward smaller builders.

Keep the video and slide presentations to shorter lengths for each segment.

Put some time aside to simulate a "generic" modern shipyard. Place a bid, develop drawings, a plan, meet with managers, supervise build, continuous improvement, build blocks etc...Then deliver ship (i.e. walk us through an exact process of modern ship production).

Split up breaks more often for less time. Break up course, maybe for advanced shipyard people and less advanced.

Might be better to take shorter breaks more often, e.g. 10 minute break each hour.

Use shorter instruction periods with more shorter breaks.

Organize the package better. If the slides were all in one place it would be easier to take notes. Plus you wouldn't have to deal with the distraction of everyone flipping through pages looking for slides.

Modern Ship Production  
Washington DC

Scheduled Attendees: 28

Actual Attendees: 22

**Any Other Comments?:**

Good class for experiencing Navy cost estimates to shipbuilding.

At the rate of advancement in technology, especially computers, it seems that a shipyard would have to make a return on investment in 2-3 years and replace/update equipment at this rate in order to stay at state of the art! Beyond this who will be around to support, maintain, re-program this "old" equipment.

Well presented workshop with an in depth knowledge of ship production. Scottish "twang" made me feel comfortable. Great to hear the historical points of British shipbuilding that I had almost forgotten.

Enjoyed the course and would enjoy taking more courses.

Good well balanced course.

Good course!

Need material that can be given to senior trades and managers vice office types.

Present more up-to-date information on what is happening in Japanese and Korean yards today.

I would like to see design of construction details which saves production time and sequence of construction.

The discussion of both producibility and design for production was no accident. Possibly do a synopsis of the other "design for production" course before getting into modern ship production (also organize class notes a little better).

Very enjoyable.

Excellent overview was very helpful to me as a non-naval architect. I look forward to the workshop later this month.

This course is a perfect length.

For more information about the  
National Shipbuilding Research Program  
please visit:

**<http://www.nsrp.org/>**

or

**<http://www.USAShipbuilding.com/>**